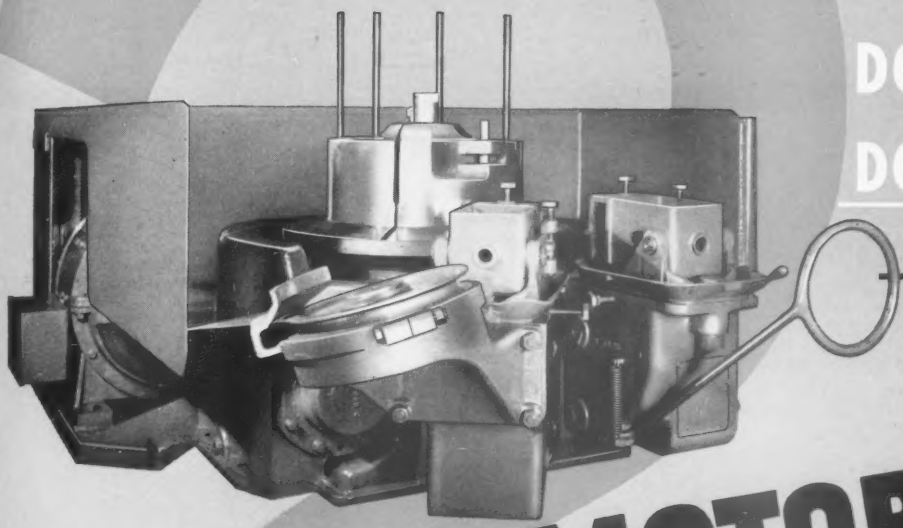
WIRE AND WIRE PRODUCTS

SEPTEMBER 1957



DOUBLE DECK
DOUBLE COOLED
DOUBLE ABLE

—to do the job for you!

Vaughn® MOTOBLOCS®

"Quick on the Draw!"

When high carbon rods or equally demanding material make problems for you, turn the job over to Vaughn MOTOBLOC. Double deck, air *and* water cooled, with double die holders, this completely capable unit takes the wrinkles out of wire-room foreheads! *Ask us for the details.*

THE VAUGHN MACHINERY CO.
CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

Payoffpak®...

Continental's new way to send a wire

By automatically packaging wire as it is drawn, Continental's Payoffpak has revolutionized the handling of wire! These fibre drums put an end to small manually handled coils that are costly to produce and costly to use. What's more, the wire is untouched by dirty or sweaty hands and remains protected in the sturdy drums until ready to use. Lightweight Payoffpaks can hold 600 lbs. of wire each; high stacking strength means you can save on storage space too.

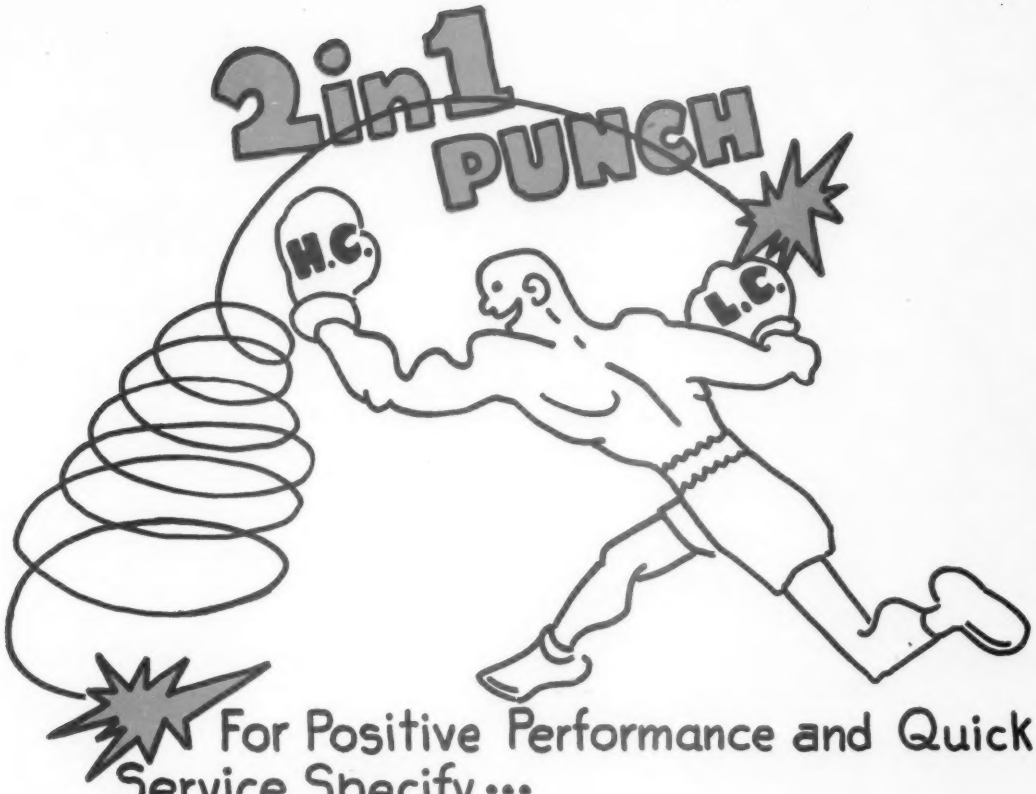
So check into Payoffpak—it will mean bigger profits for you. Call Continental soon for the interesting facts.

CONTINENTAL CAN COMPANY

FIBRE DRUM AND CORRUGATED BOX DIVISION

NEW YORK, N. Y.

Van Wert : Philadelphia : Pittsburgh : Tonawanda : Cleveland : Chicago
Atlanta : St. Louis : San Francisco : Los Angeles : Eau Claire : Boston



For Positive Performance and Quick Service Specify ...

"America's finest Wire Drawing Lubricants"

HAVE YOU INVESTIGATED

Standard 55?

More Rope Wire Is Drawn Thru Standard No. 55 Than All The Rest of the Wire Drawing Lubricants Combined.

Standard Industrial has pioneered in most of the outstanding contributions to better wire drawing through better lubricants. Consult Standard Industrial for the solution of your difficult problems.

Standard No. 55 Has Numerous Other Splendid Applications—May We Show You Why?

Standard Industrial COMPOUNDS CO., INC.

FRANKFORT, ILLINOIS

(A suburban Chicago area city)

TELEPHONES: 2131 — 2141

With

NOPCO® KLY

a liquid fine wire drawing lubricant

Be sure to try Nopco KLY next time you're drawing fine size steel or fine and intermediate size copper wire. It's *different*—and everything different about it you'll find is a big advantage.

First, this emulsifiable oil mixes quickly and completely with water—hot or cold. This feature alone is enough to make it ace-high with you. But it has other advantages equally important.

Your bath lasts longer. Nopco KLY has a built-in affinity for water. Its lubricants stay *uniformly active* much longer, since the "drag out" of the lubricants from the solution is reduced beyond anything you've ever seen.

Prevents Formation of Insoluble Copper and Lime Soaps—both the copper soaps, which score dies, clog feed lines and screens; and the lime soaps you've been bothered with when drawing lime coated steel wire.

KLY may be used for high carbon, low carbon, limed, galvanized, and liquor finished fine steel wire—also for fine and intermediate copper, bronze, and brass wire. You'll surely want to try this die-saving, cost-saving lubricant soon. Write today for free booklet "Nopco KLY", which gives full instructions, lists percentages of fat in all emulsions.
Nopco Chemical Company,
Harrison, N. J.

YOU MIX IT FASTER, EASIER

YOUR BATH LASTS LONGER

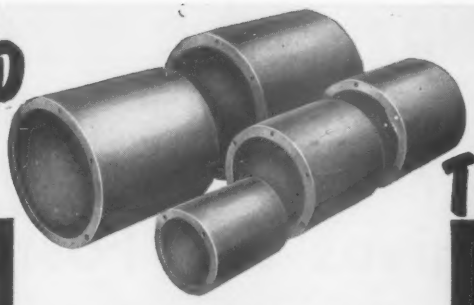
YOU GET UNIFORMLY ACTIVE LUBRICATION

1907–1957 50 Years OF PROGRESS IN CHEMISTRY

NOPCO

PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif.
London, Canada

HUBBARD TRAVERSES



EASILY ASSEMBLED IN 4 RAPID STEPS TO SAVE COST AND TIME

1 PLACE BOLTS IN REEL HEAD

2 SET HEAD ON FLOOR, BOLTS UP

3 TRAVERSE POSITIONED ON WOODEN HEAD

4 TOP HEAD LAID ON TRAVERSE AND BOLTED DOWN

HUBBARD TRAVERSES are made for nailed wood, plywood, metal bound and cast flanges, constructed of one sheet of metal—rolled, welded and flanged—in painted galvanized or plain finishes . . . easy to assemble and to repair . . . reduces damage to cable . . . increases life of reel due to rigid one piece barrel.

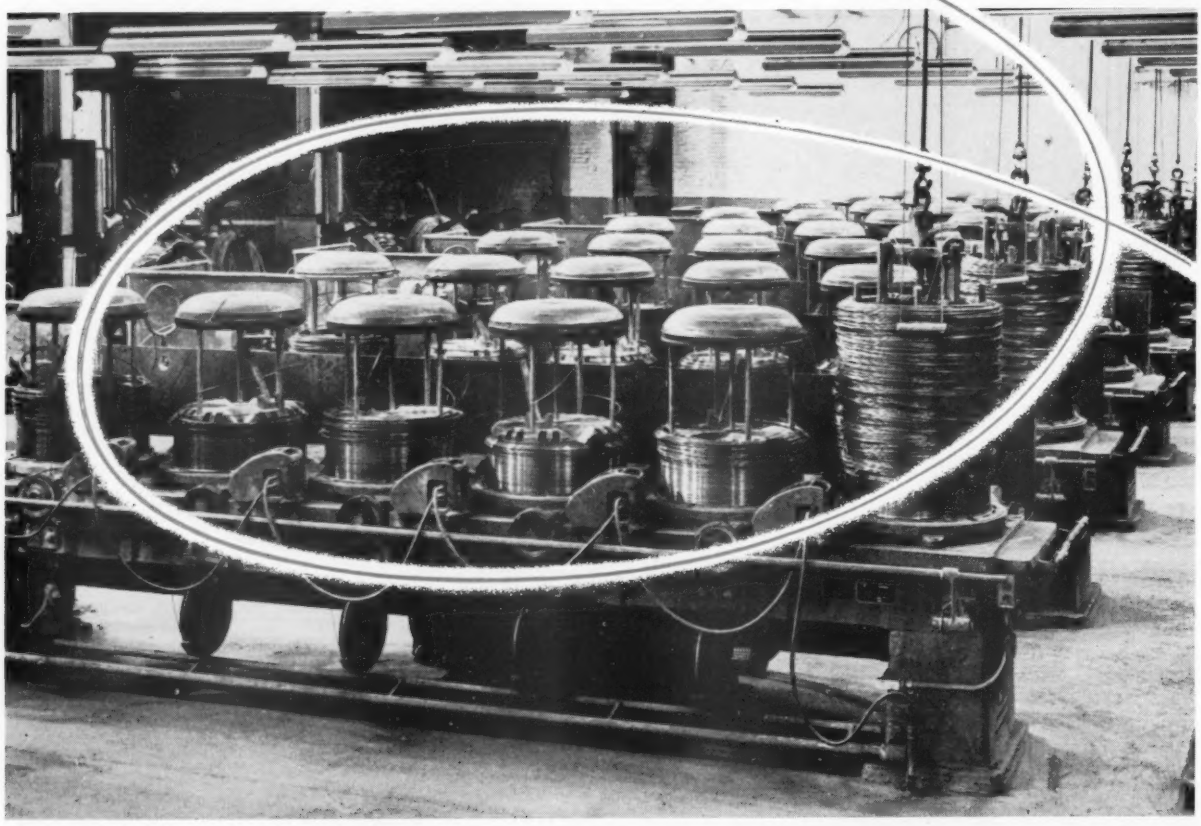
Besides TRAVERSES, every type of REEL and SPOOL—returnable and non-returnable in all materials is made by HUBBARD for shipping and shop use.

WRITE FOR PRICES AND COMPLETE INFORMATION.

HUBBARD SPOOL CO.

GARRETT, INDIANA Tel.: GArrett 840

MORGAN-CONNOR
AIR COOLING
gives You Fast Drawing—
Superior Products



A battery of Morgan-Connor Machines in operation. Note the minimum space required for each machine.

Morgan-Connor Wire Machines use an exclusive air-cooling method to keep the wire really cool.

Results — a superior product!

WM-103

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASS.

WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 32 September, 1957 No. 9

Designated as Official Publication By The Wire Association

Contents

The Wire Outlook 989

A Notable Wire Rod Mill in Sweden
by L. W. Passmore 991

Die Refinishing With Boron Carbide Abrasive
by E. Leslie Anderson 995

Production of Round Film Insulated Wires
by Carlisle B. Burns 996

Thermal Embrittlement Of The More Crystalline Polyethylenes
by R. H. Carey, J. A. Snyder and H. C. Vakos 998

Nylon in Wire and Cable
by A. L. Gibson 1001

The Measurement of Small Resistance Changes
by Clifford C. McMahon 1005

Rope Wire Questions and Answers 1008

Wire Works Wonders On Today's Academic Scene
by Ruth April 1010

Wire Association Annual Convention Program 1011-1014

New Trends in High Temperature Cables
by B. J. Mulvey 1015

Washington Report
by Larston D. Farrar 1018

Abstracts 1020

Outstanding Personalities of the Wire Industry 1026

A Review of Recent Wire Patents 1032

Steel Statistics 1039

Copper Statistics 1040

Aluminum Statistics 1041

Index to Advertisers 1059

Where-to-Buy 1060-1064

WIRE and WIRE PRODUCTS is indexed regularly by Engineering Index, Inc., New York, N. Y.

RICHARD E. BROWN, President and Publisher

R. S. Spengel, Secy.-Treas. & Gen'l. Manager
J. Edward Donnellan, Vice-President

Edmund D. Sickels, Editor

— ASSOCIATE EDITORS —
Lancaster, Allwine & Rommel, Consultants on Patent Information

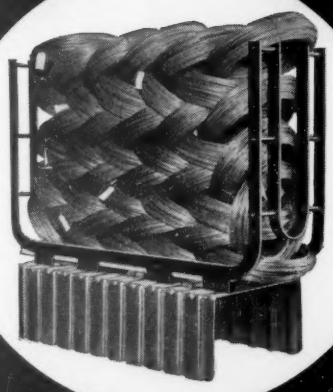
Publication Office: Jersey City, N. J.
Executive Office: 453 Main St., Stamford, Conn.
* Reg. U. S. Pat. Off.

WIRE & WIRE PRODUCTS, Vol. 32, No. 9, September, 1957. Publication Office at One Sherman Avenue, Jersey City, N. J. Executive Office 453 Main Street, Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Sec'y and Treas. Subscription Price: U. S. $8.00; Canada, $8.00 per year; Domestic 75 cents per copy; Foreign 90 cents per copy, except October Convention Issue and January Proceedings Issue, $1.25 per copy; Foreign $10.50 per year. Entered as second class matter at the Post Office, Jersey City, N. J. under the act of March 3, 1879.

Copyright, 1957 Quinn-Brown Publishing Corp.

Scott Printing Company, Jersey City 7, New Jersey

REPUBLIC
Stack 'N Store
UNITS



- Speed Wire Handling
- Save Floor Space
- Reduce Costs

Plagued by the problem of how to put existing wire-storage space to better use? Republic Stack 'N Store Units free valuable floor space for more productive purposes, and provide better inventory control.

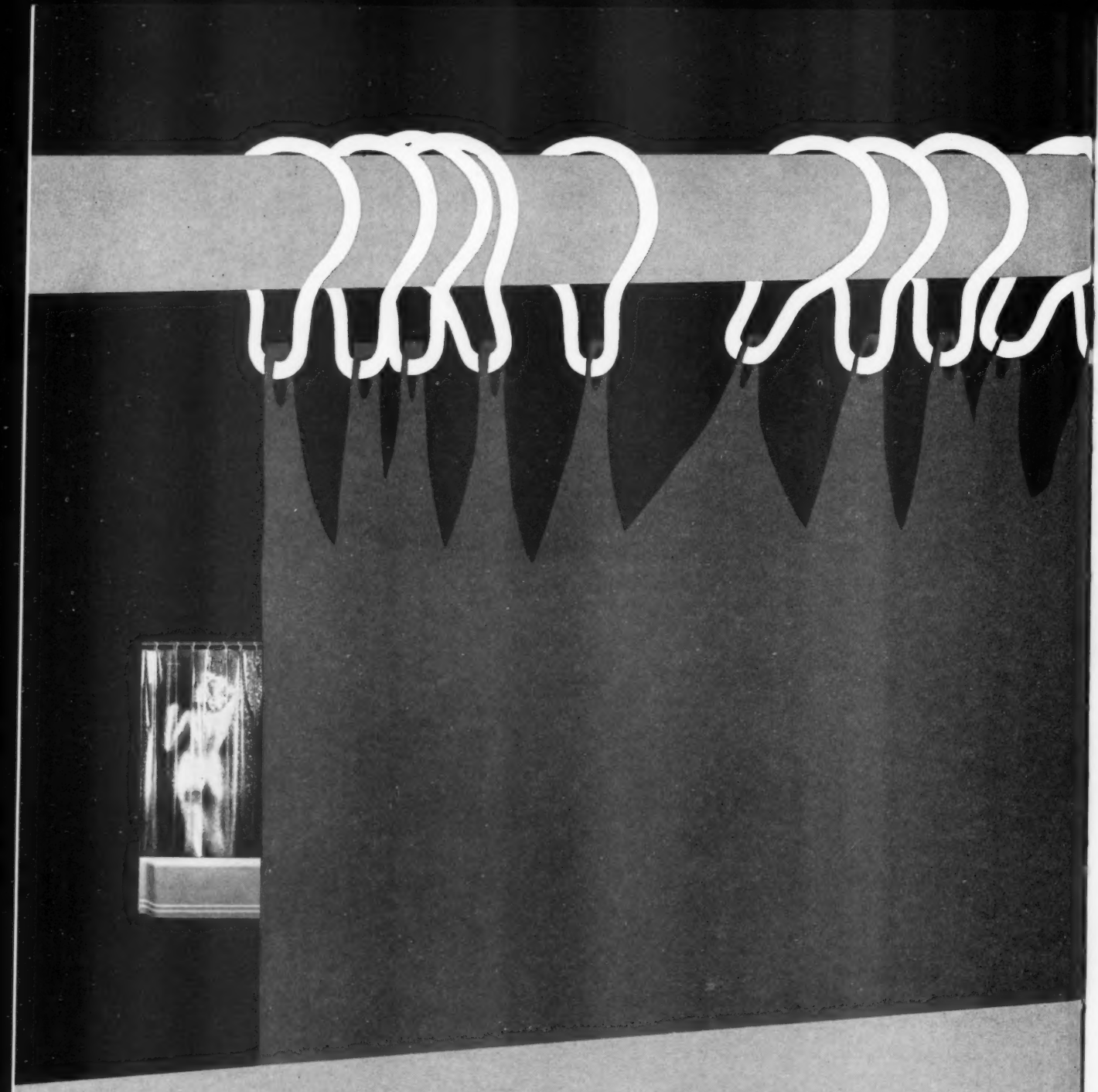
Coiled wire is stacked in neat tiers in specially designed "U" shaped superstructure. Fully loaded superstructure is moved quickly and easily by crane to production areas. Or it may be placed on a skid and moved by lift truck to a storage area for future use.

Stack 'N Store Units may be the answer to reduced costs and improved wire handling in your plant. Why not talk it over with a Republic Engineer? There's no obligation. Just mail the coupon.

REPUBLIC STEEL CORPORATION
DEPT. C-4091
3222 EAST 45th STREET • CLEVELAND 27, OHIO

☐ Send more information on Stack 'N Store Units.
☐ Have an engineer call.

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____



a profitable idea!

These curtain hooks are fabricated on a four-slide machine from Alcoa® Aluminum Wire . . . light, strong, rustproof. They're good looking, can be anodized in blue, gold—various colors. If you use wire in your product, check into the many advantages of aluminum.

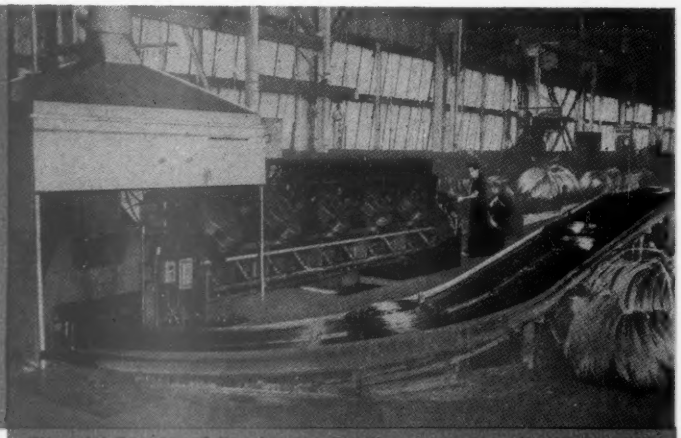
Alcoa has set up a special department to work with you on profitable new ideas, new uses for aluminum wire. For immediate action, write ALUMINUM COMPANY OF AMERICA, Wire Products Development, 875-E Alcoa Bldg., Pittsburgh 19, Pa.

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM WIRE PRODUCTS ALUMINUM COMPANY OF AMERICA

THE ALCOA HOUR • Television's Finest Live Drama • Alternate Sunday Evenings

Waterbury Farrel TANDEM ROD MILLS *in Action . .*



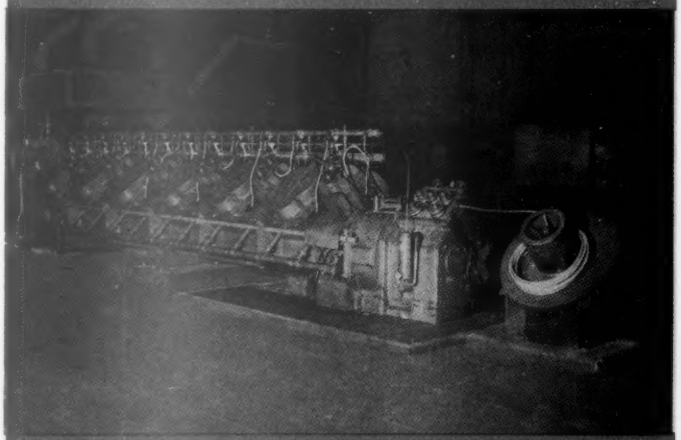
7" x 2" Ten Stand Tandem Rod Mill in operation for Anaconda American Brass Ltd. (Subsidiary of the American Brass Co.) New Toronto, Ontario, Canada. Starting size 25/32" round rod and finishing to .314" modified square at 250 feet per minute.

You can reduce 1" rod down to 5/16" efficiently and economically on Waterbury Farrel Tandem Rod Mills. Here are the specific advantages provided by these mills over the older process of drawing through dies after the 3-high mill operation:

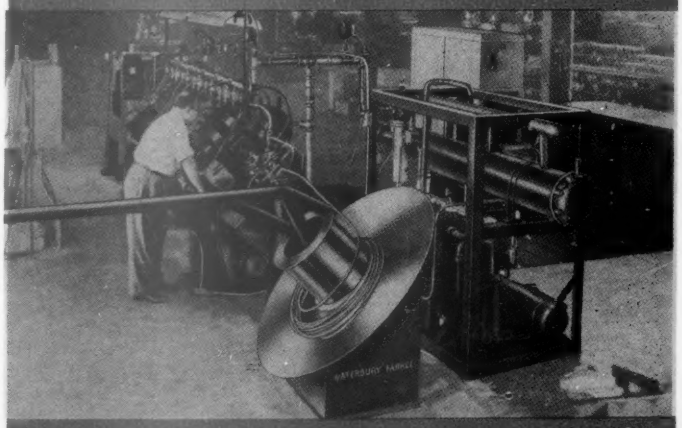
- Does not Require Pointing.
- Much greater reduction in single pass.
- Greater Production rate.
- Reduces handling time.
- Anneals at lower temperature and results in better surface and grain structure.
- Eliminates intermediate annealing or pickling.

Represented at the right are a few of the companies taking advantage of these production benefits. Each installation illustrates Waterbury Farrel's custom-engineering ability to design and build rugged, dependable equipment for specific production needs. Whatever your rod requirements may be, Waterbury Farrel can furnish a Tandem Rod Mill to fit your program.

Write today, for your free copy of Tandem Rod Mills Circular No. 729-R.



7" x 12" Twelve Stand Tandem Rod Mill installed in Bristol Brass Corp., Bristol, Conn. Starting size ¾" round rod and finishing to .250" modified square at 400 feet per minute.



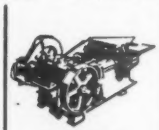
7" x 2" Ten Stand Tandem Rod Mill in operation at H. M. Harper Co., Morton Grove, Illinois. Starting size 9/16" round rod and finishing to .188" modified square in speed ranges from 85 to 253 feet per minute.

THE WATERBURY FARREL FOUNDRY & MACHINE CO.

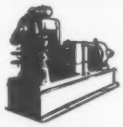
WATERBURY, CONN., U.S.A.

Sales Offices: *CHICAGO • CLEVELAND • MILLBURN, N. J.*

Bolt, Nut & Screw Machinery



Power Presses



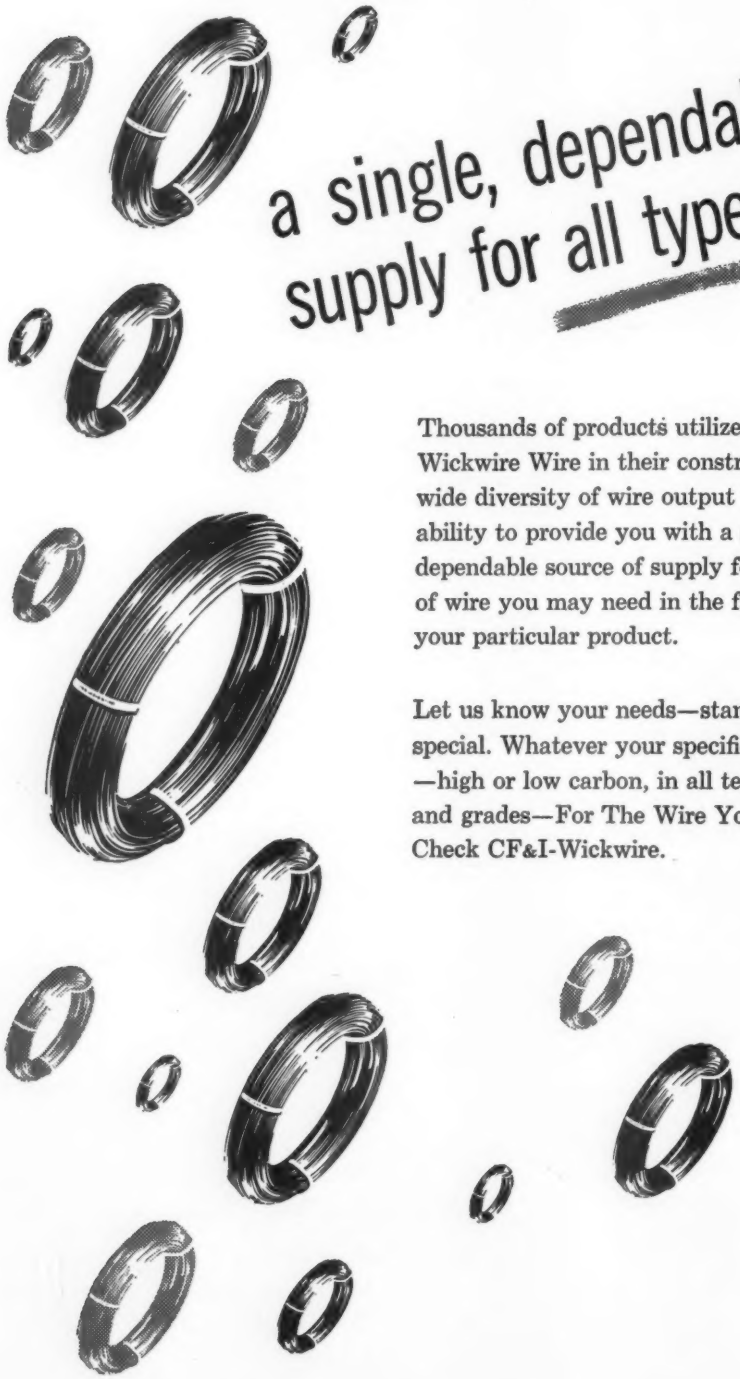
Rolling Mill Machinery

Wire Mill Equipment

Sendzimir Mills and Other Special Machinery

CF&I-WICKWIRE

a single, dependable source of supply for all types of steel wire



Thousands of products utilize CF&I-Wickwire Wire in their construction. This wide diversity of wire output is proof of our ability to provide you with a single, dependable source of supply for every type of wire you may need in the fabrication of your particular product.

Let us know your needs—standard or special. Whatever your specifications may be —high or low carbon, in all tempers, finishes and grades—For The Wire You Require—Check CF&I-Wickwire.

has the wire you require

✓ **UPHOLSTERY SPRING WIRE...**

for bedding, furniture, automobile seats and back cushions.

✓ **OIL TEMPERED WIRE**

always uniform . . . in tensile strength and high fatigue life.

✓ **HARD DRAWN MB SPRING WIRE**

for mechanical springs . . . all types and designs.

✓ **FINE AND SPECIALTY WIRE**

available in many grades, tempers and finishes to fit your requirements.

✓ **SPHEROIDIZED WIRE**

where fabrication calls for severe forming.

✓ **MANUFACTURERS WIRE**

for hundreds of wire-forming applications.

CF&I-WICKWIRE WIRE

CF&I

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings Boise • Butte • Casper • Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) Oklahoma City • Phoenix • Pueblo • Salt Lake City • Wichita • **PACIFIC COAST DIVISION**—Los Angeles • Oakland • Portland • San Francisco • San Leandro • Seattle • Spokane **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia • **CF&I OFFICES IN CANADA:** Montreal • Toronto **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg

5450

INSTANT BRAND

IDENTIFICATION

Instant brand identification for your insulated wire product is assured with non-returnable CLARK spools, which are made of brilliantly lithographed steel. With a continuous bond between barrel and head, CLARK spools are engineered for unrivaled strength and safety to your specifications, are engineered for protection of your product. Also available are non-returnable, all-metal spools for the finest gauges of fine and magnet wire.

Write today for our booklet, "Spools for Insulated Wire." Find out how Clark's integrated service and experienced specialists can work with you to develop and design sales-building spools. *J. L. Clark Manufacturing Co., Home Office and Plant, Rockford, Illinois; Liberty Division Plant and Sales, Lancaster, Pennsylvania; New York Sales Office, Chrysler Building, New York 17, New York.*

Lithographed Metal Containers **J. L. CLARK**

JAEGER

WIRE WEAVING LOOMS

FOURDRINIER WIRE LOOMS and CLOTH STRETCHING MACHINES

SCREEN ASSEMBLING LOOMS

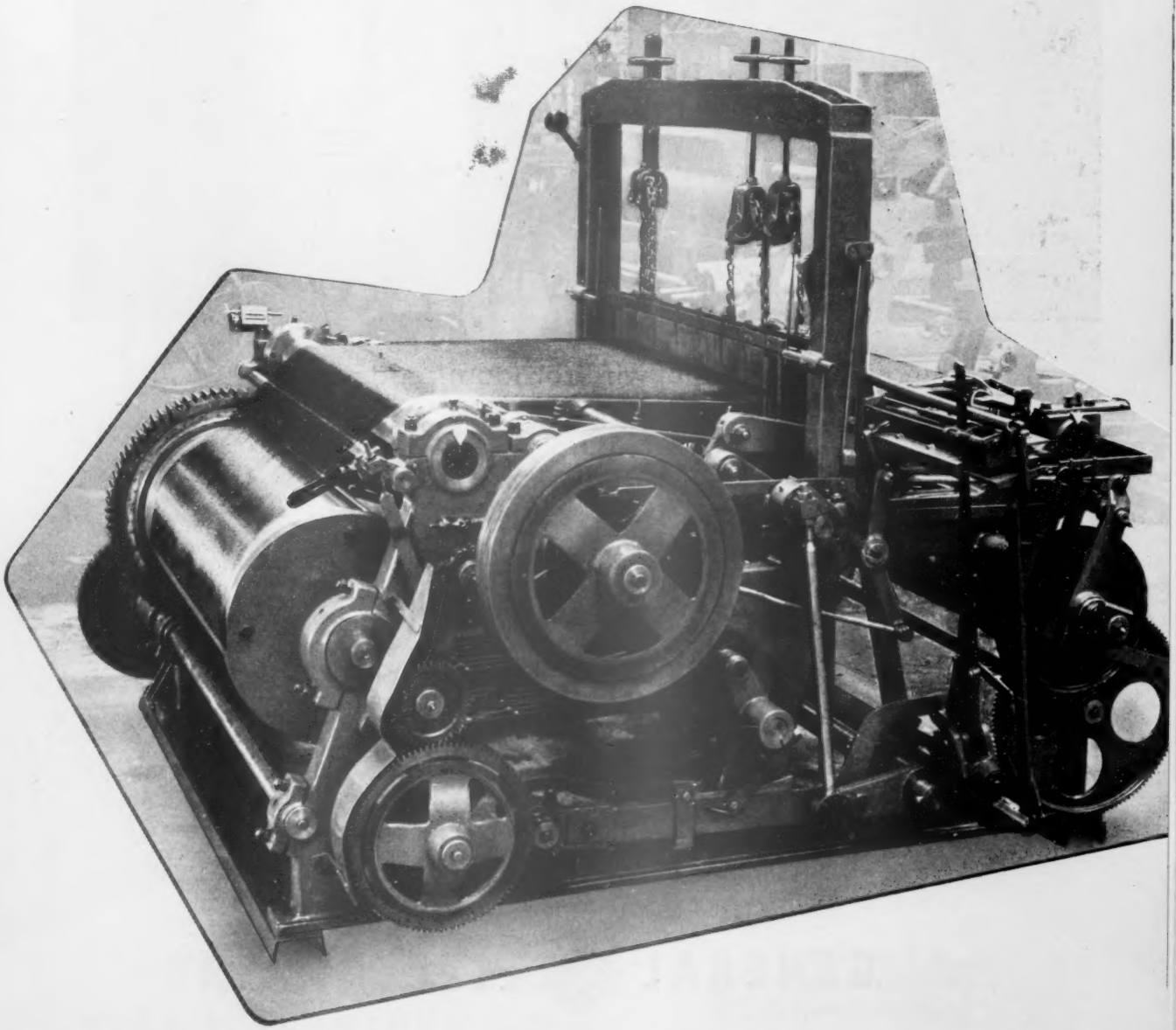
CRIMPING MACHINES

AUXILIARY MACHINES FOR WIRE WEAVING

Model DFM

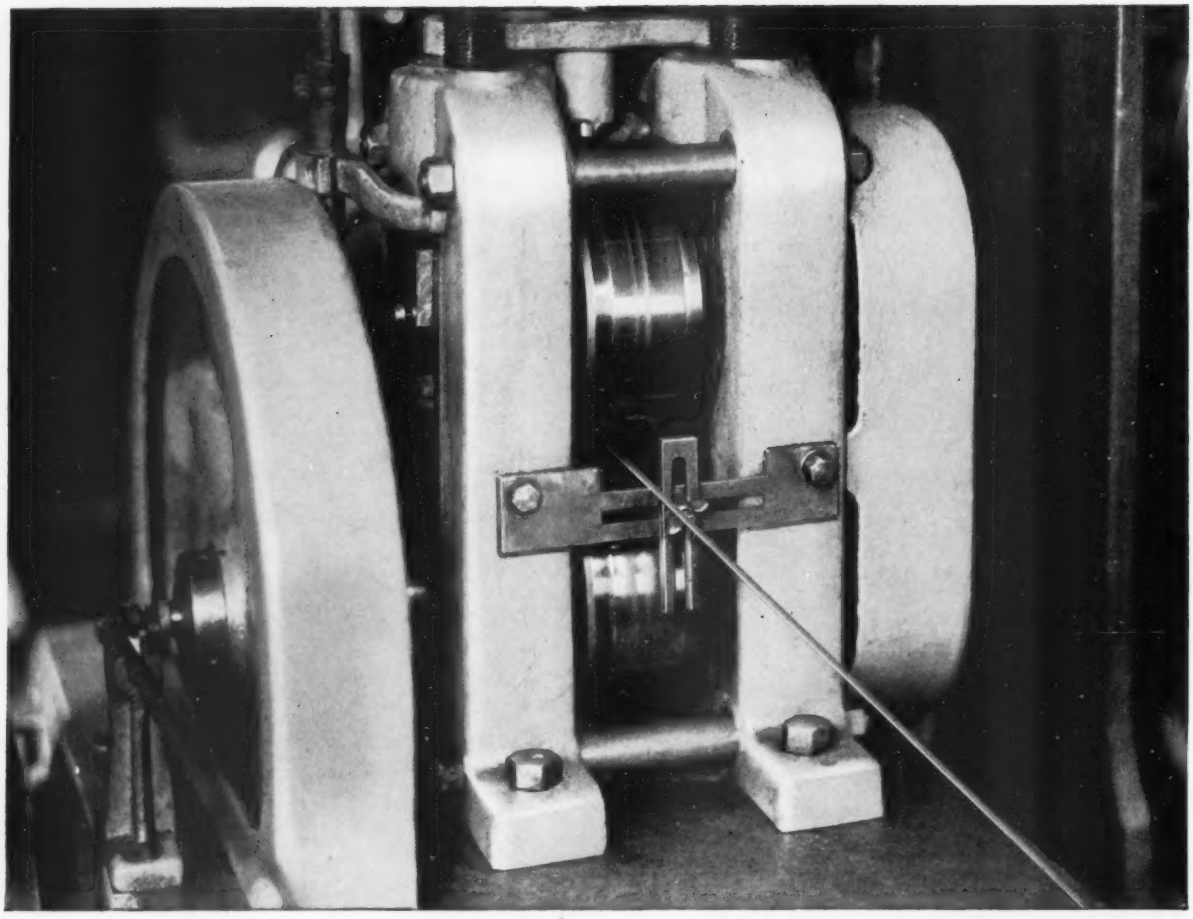
Heavy Fly Shuttle Loom

for meshes 20-300 p. inch and wire from .0014" to .023"



Sole Representatives for U.S.A. and Canada

CEDAR-WEST TOOL CO., INC. • 88-90 WEST ST., NEW YORK 6, N. Y. • Tel. REctor 2-1530



Flattening stainless-steel wire for loom reeds . . .

CARBOLOY FLAT-WIRE ROLLS USED 4 YEARS; 8 MORE YEARS POSSIBLE BEFORE REGRINDING

Every week for four years, three 65-lb. coils of stainless-steel wire for loom reeds were flattened by these Carboloy carbide rolls. Five passes were required to reduce the wire from .053″-.058″ diameter to an average thickness of .011″, in widths of .105″ and .125″.

In all, more than 200,000 lbs. of wire have passed through these rolls since 1953. Gowdy Reed Co., Providence, R. I., expects eight more years of service before they need regrinding—because only three of the possible nine rolling spots have been used. Wire thickness and width are still accurate; finish is still lustrous and polished.

Before they are reground, these Carboloy flat-wire rolls will have more than paid off the initial investment for Gowdy. After regrinding, these carbide rolls will continue to roll hundreds of thousands of pounds of precision flat wire.

Long life like this, with substantial reductions in downtime, maintenance, and manpower, are typical of the savings Carboloy cemented carbide rolls, dies, and other products are bringing to the wire industry.

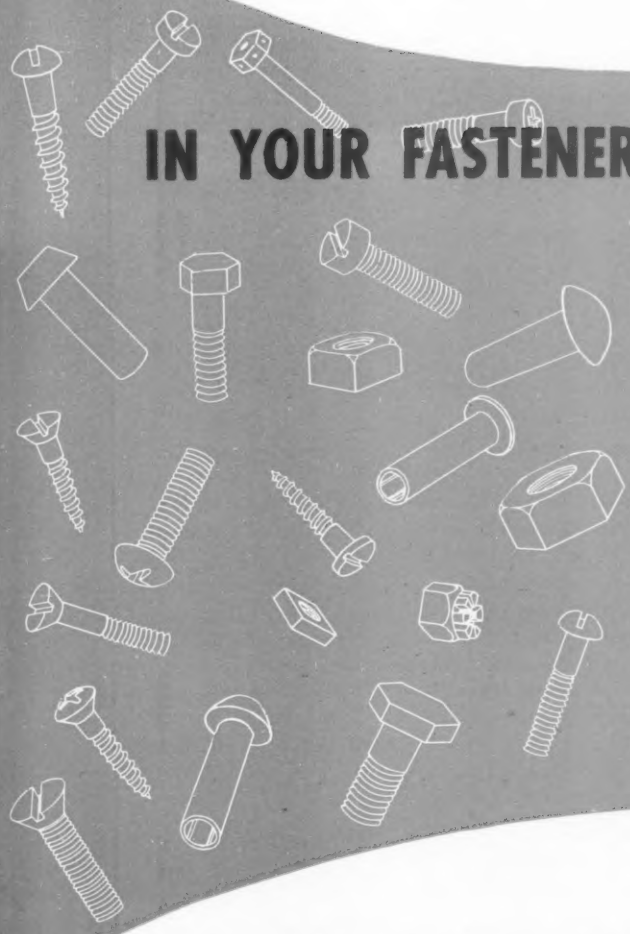
Whether your business is flattening, drawing, extruding, or heading, you can gain similar benefits with Carboloy cemented carbide products. For more information, or in-plant technical assistance, write: *Metallurgical Products Department of General Electric Company, 11171 E. 8 Mile Blvd., Detroit 32, Michigan.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

are you missing the boat . . .

IN YOUR FASTENER AND PARTS BUSINESS?



Recent surveys show that a very small percentage of the potential aluminum fastener market is now being sold.

Now is the time for you to cash in on this profitable market, the growth of which is inevitable.

Avail yourself today of Nichols' wide experience and modern wire making facilities. Aluminum wire made to your exact specifications in all commercial alloys and tempers. We are waiting to serve your needs.

nichols
WIRE & ALUMINUM CO.
DAVENPORT, IOWA

nichols
NEVER-STAIN
®

U.S.I.

Vol. II, No. 5

POLYETHYLENE PROCESSING TIPS

HOW CARBON BLACK QUALITY AFFECTS WEATHER RESISTANCE OF POLYETHYLENE

For cable jacketing and many other outdoor applications polyethylene offers substantial advantages over other materials. It is subject, however, to degradation from long exposure to sunlight unless the resin is properly protected.

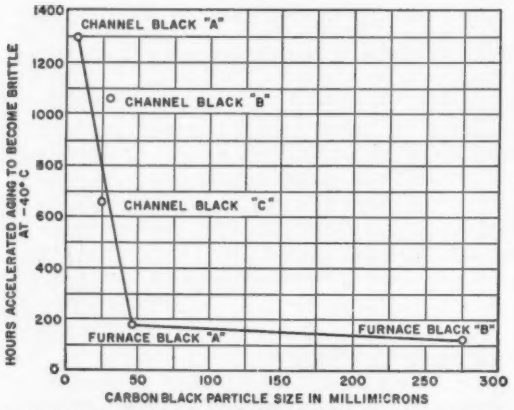
Actually, the aging of polyethylene is the result of a chemical reaction with atmospheric oxygen. Catalyzed by the ultraviolet rays in sunlight, this reaction proceeds more rapidly in outdoor use than is the case with indoor applications. The principal effects of aging are to increase brittleness at low temperature, and to decrease the resistance to stress cracking.

Carbon black dispersed throughout the polyethylene greatly retards this aging, or weathering. However, not all carbon blacks produce the same degree of weather resistance when dispersed in polyethylene. Moreover, the care with which the carbon black is dispersed in the polyethylene is vitally important.

The weather resistance of a polyethylene compound depends on: (1) type and particle size of carbon black; (2) percentage of carbon black in the compound; (3) the dispersion of the carbon black in the polyethylene.

Accelerated aging tests have been devised to approximate the action of years of outdoor exposure.

The graph below shows the great difference in number of hours required in these tests for a polyethylene to embrittle at −40°C when various carbon blacks having different particle sizes are used.



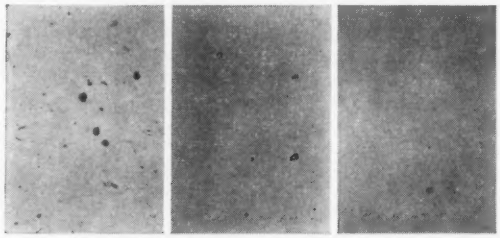
EFFECT OF CARBON BLACK PARTICLE SIZE ON ACCELERATED AGING OF POLYETHYLENE.

The two at right are "furnace blacks", and it will be noted that they are comparatively ineffective. The three at the left are "channel blacks", and obviously, they are many times more effective. This is due to their much smaller particle size – from about 10 to 25 millimicrons, against 50 to 275 millimicrons for furnace blacks.

Weather resistance also increases with the concentration of carbon-black – up to a point. Beyond this point the light screening effect is offset by a decline in other properties.

DEGREE OF DISPERSION IMPORTANT

Carbon black gives maximum protection only when it is thoroughly dispersed in the polyethylene. This presents a difficulty because the smaller the particles, the greater is their tendency to collect into clusters which, once formed, are hard to break up. Tests show that a good dispersion will withstand 15 to 20 times as much exposure to sunlight as a poor dispersion.



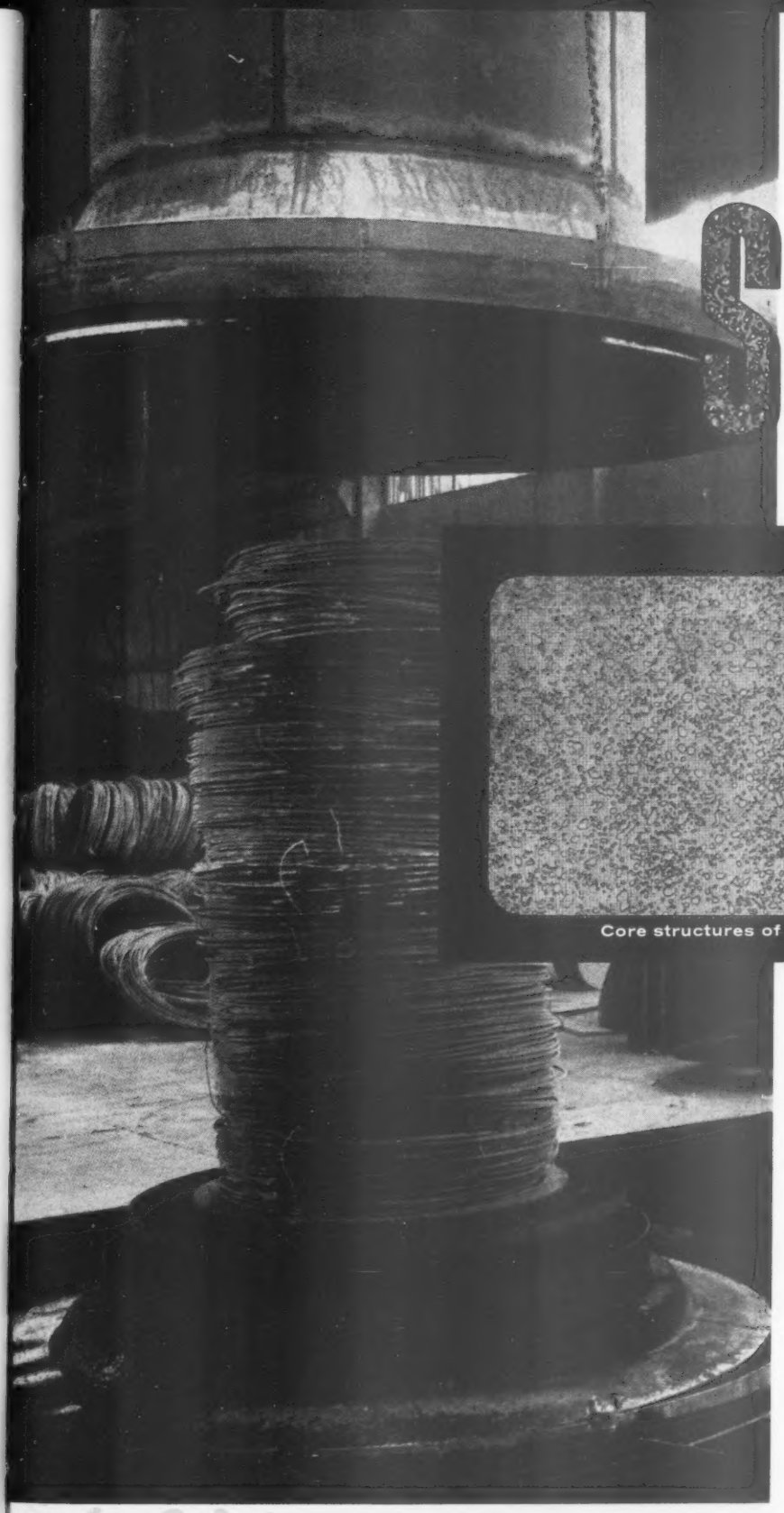
POOR FAIR GOOD

MICROPHOTOGRAPHS OF CARBON BLACK DISPERSIONS IN POLYETHYLENE.

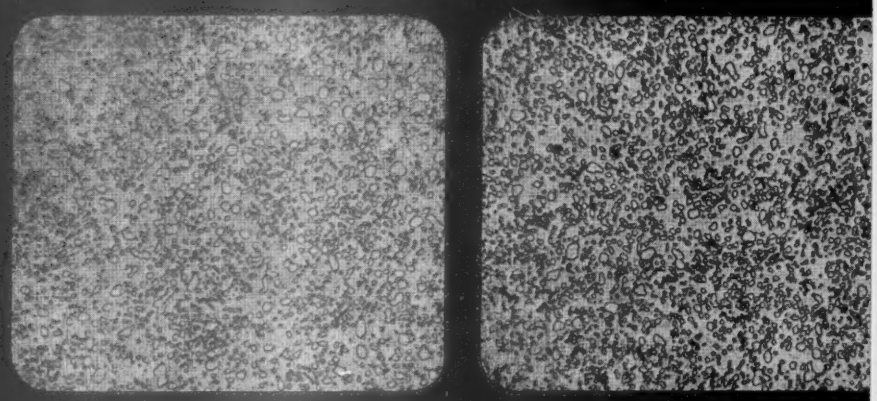
The wire and cable grades of U.S.I.'s PETROTHENE polyethylene resins employ only the finest "channel black" carbon black. Concentration is set at a point which yields the optimum balance of light screening and other properties. Special processing equipment insures thorough dispersion. The result is black polyethylene that withstands long, severe outdoor exposure, yet affords the practical maximum of tensile and other properties.

If you fabricate or use black polyethylene, ask U.S.I. for complete technical data on PETROTHENE resins expressly formulated for weather resistance.

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corporation
99 Park Avenue, New York 16, N. Y.
Branches in principal cities



HERE'S Spheroidizing AT ITS FINEST...



Core structures of spheroidized rod, magnified 1000 times.

SPHEROIDIZING PROCESS MADE EASY WITH LEE WILSON HIGH CONVECTION FURNACES

Nothing rolls like a ball — this applies to bearings as well as the grain structure of steel which is to be formed cold into bolts, auto bumpers, lock washers or razor blades.

To get this spheroidal structure in steel, the metal must be uniformly heated, but in no part overheated, and, after all parts of the charge are at the temperature required, it must be uniformly cooled at controlled rates so that the iron-carbon grains will have the shape of a ball as they form.

This heat treatment of steel has enabled fabricators to eliminate slow and expensive hot forming processes and to cold form a multiplicity of items at almost unbelievable speeds.

The Lee Wilson High Convection Bell Type Annealing Furnace with uniform heat application, specialized cycle control, and gas circulation up to 25,000 cfm. under a sealed inner cover, was designed specifically to meet all the requirements for uniformity and closeness of control demanded by this process.

Lee Wilson* ENGINEERING COMPANY, INC.
20005 WEST LAKE ROAD • CLEVELAND 16, OHIO

HIGH CONVECTION ANNEALING FURNACES
MAKE THE BEST METALS BETTER

*ORIGINATORS AND LEADING PRODUCERS OF HIGH CONVECTION ANNEALING FURNACES

ARE YOU INTERESTED IN CUTTING COSTS *in the production of* GALVANIZED SCREEN CLOTH WIRE?

Then

APEX "KEM-KOTE"

WILL DO THE JOB FOR YOU—

by completely eliminating costly copper coating and the necessity of wet storage and wet payoff reels.

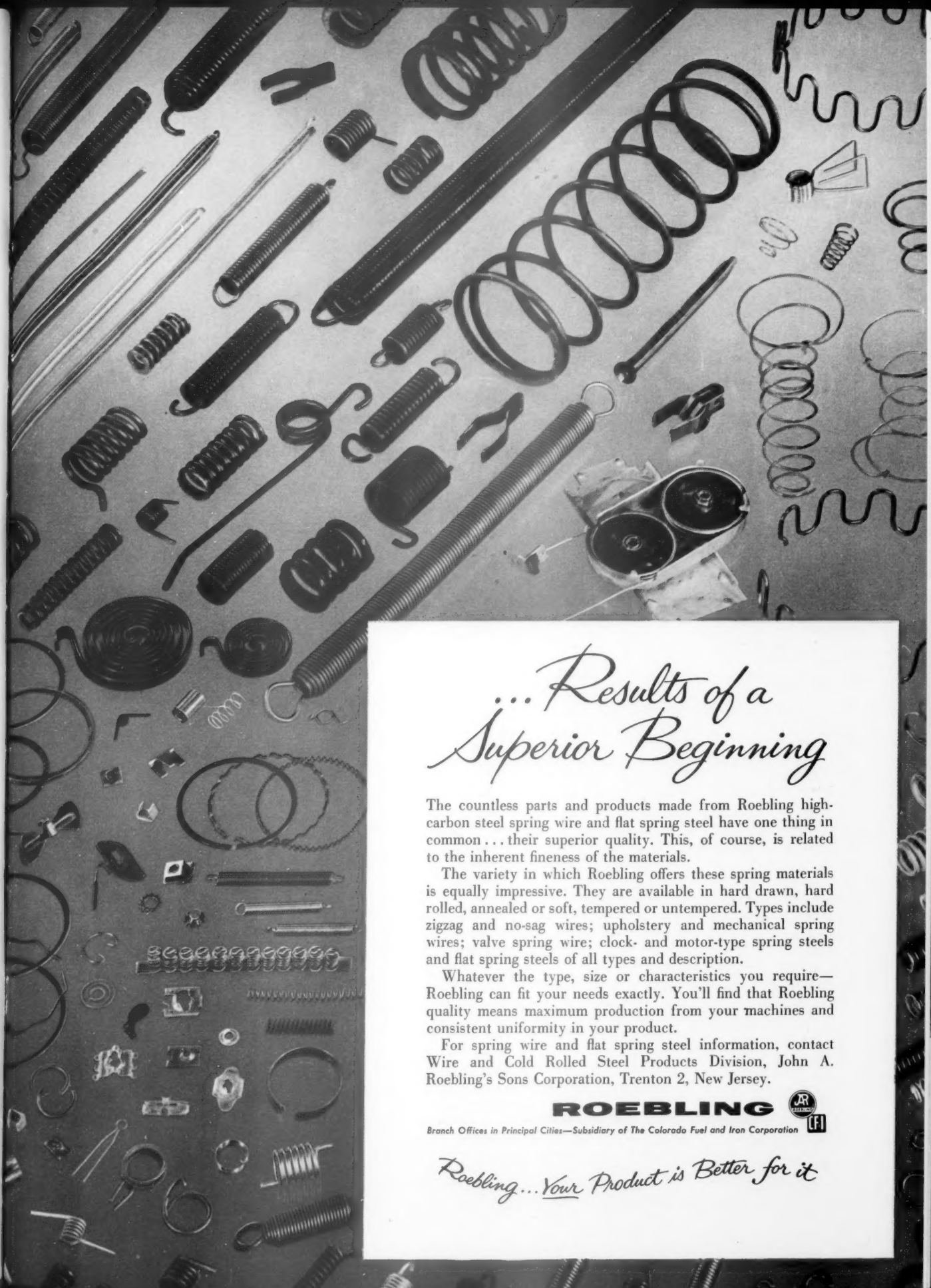
APEX "KEM-KOTE" may be applied by the batch or strand method, producing an oxide-free surface suitable for wet drawing, and resulting in finished wire with excellent weaving and electro-galvanizing characteristics.

Immediate shipments available for your production testing.

APEX ALKALI PRODUCTS COMPANY

Lubricants & Cleaning Compounds for Wire and All Wire Products

Main and Rector Streets · Philadelphia 27, Pa. · IV 3-3939



...Results of a Superior Beginning

The countless parts and products made from Roebling high-carbon steel spring wire and flat spring steel have one thing in common... their superior quality. This, of course, is related to the inherent fineness of the materials.

The variety in which Roebling offers these spring materials is equally impressive. They are available in hard drawn, hard rolled, annealed or soft, tempered or untempered. Types include zigzag and no-sag wires; upholstery and mechanical spring wires; valve spring wire; clock- and motor-type spring steels and flat spring steels of all types and description.

Whatever the type, size or characteristics you require—Roebling can fit your needs exactly. You'll find that Roebling quality means maximum production from your machines and consistent uniformity in your product.

For spring wire and flat spring steel information, contact Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities—Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

Large diameter tubing and cables are no problem with . . .

DAVIS-STANDARD ROTATIVE CROSSHEAD EXTRUDERS*

Another Davis-Standard exclusive!
The Rotative Crosshead Extruder solves the problem of poor distribution of compound around the core tube. The internal design of the Rotative Crosshead creates a uniform flow of compound over and under the core tube to eliminate low pressure areas.

Even Wall Thickness around the entire circumference of both tubing and cable insulation.

"Knit Marks" caused by core supports and low compound pressure are reduced to an absolute minimum.

Uniform Coverage is assured throughout entire length of cable or tubing.

The **ROTATIVE CROSSHEAD EXTRUDER** is available in many sizes from 1½ inches I.D. to approximately 6 inches I.D. Excellent results have been obtained on practically all rubber and synthetic rubber compounds and most thermoplastic materials now being extruded.

*U. S. Patent No. 2794213

D-S MYSTIC CONNECTICUT U.S.A.

DAVIS-STANDARD

Division of FRANKLIN RESEARCH CORPORATION

12 WATER STREET, MYSTIC, CONNECTICUT

IN EUROPE AND THE STERLING AREA, CONTACT FINNEY PRESSES LTD., BIRMINGHAM, ENGLAND

SWIFT
& COMPANY
proudly announces
THE
FLEXALS
new complex metallic
wire drawing compounds

Swift
102ND YEAR

and
FREDDIE FLEXAL
invites your
further
inquiry

SWIFT & COMPANY, Industrial Soap Dept. S-34
4115 Packers Ave., Chicago 9, Illinois

☐ How can we place a trial order for Flexal for evaluation in our operations?

☐ Please send a FREE 10 lb. sample of Flexal for our evaluation.

(Please describe intended usage briefly).....

.....

Company.....

Address.....

City.....Zone....State.....

Your Name & Position.....

NOW! at low cost twist any number of conductors to make cable up to 1" diameter

only the COOK MULTIPLE INSULATED WIRE TWISTER provides such flexibility

Here's a twister that offers the flexibility required of todays wire mills manufacturing insulated cables. It's truly flexible —you can make any cables required up to 1" diameter.

And, because the COOK MULTIPLE INSULATED WIRE TWISTER is so low cost, it is the practical addition to your plant. Compare it with any other machine on the market doing this work . . . compare its performance . . . compare its cost . . . compare its construction. Why not see for yourself . . . write for complete specifications and prices today.

SPECIFICATIONS

Production	9,000 ft/hr at 7½" lay
Reel Size	30" std. also from 16-36" dia.
Floor Space	6 ft. x 8 ft. max.
Lay Range	¾" to 7½"
Twist	Right or left hand
Finished Wire Size	Up to 1" dia.
Wrapping Head	Optional
Neutralizer	Optional

COOK

MANUFACTURING CO.

50 EAST 25th STREET, PATERSON, N. J. • ARMORY 4-6380

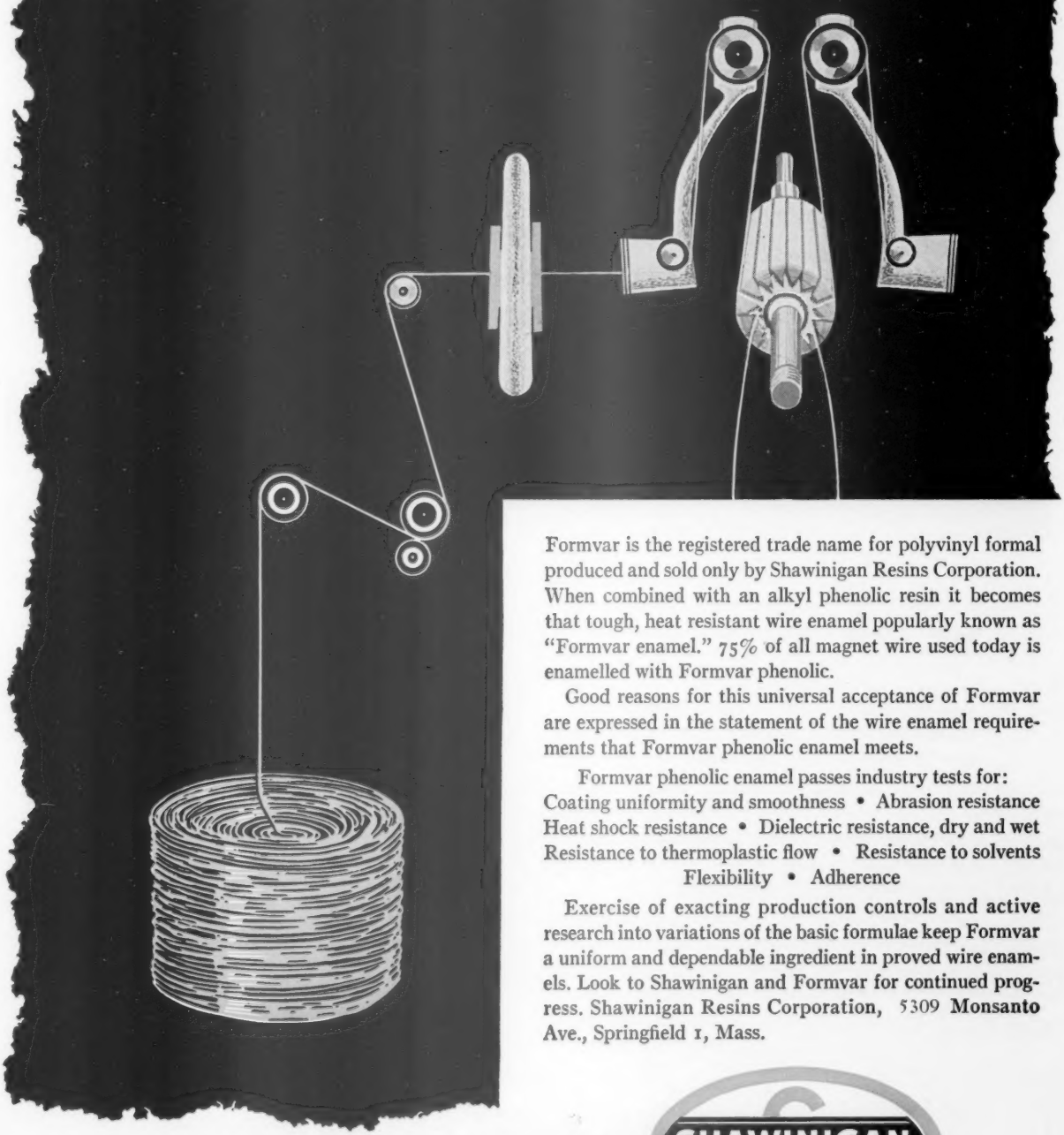
•

CANADIAN AGENT:
E. V. LARSON CO., LTD., TORONTO, CANADA

•

EUROPEAN AGENT:
CAPAMADJIAN LE MONNIER CIE LTD., PARIS, FRANCE

FORMVAR . . .
the name everybody depends on!



Formvar is the registered trade name for polyvinyl formal produced and sold only by Shawinigan Resins Corporation. When combined with an alkyl phenolic resin it becomes that tough, heat resistant wire enamel popularly known as "Formvar enamel." 75% of all magnet wire used today is enamelled with Formvar phenolic.

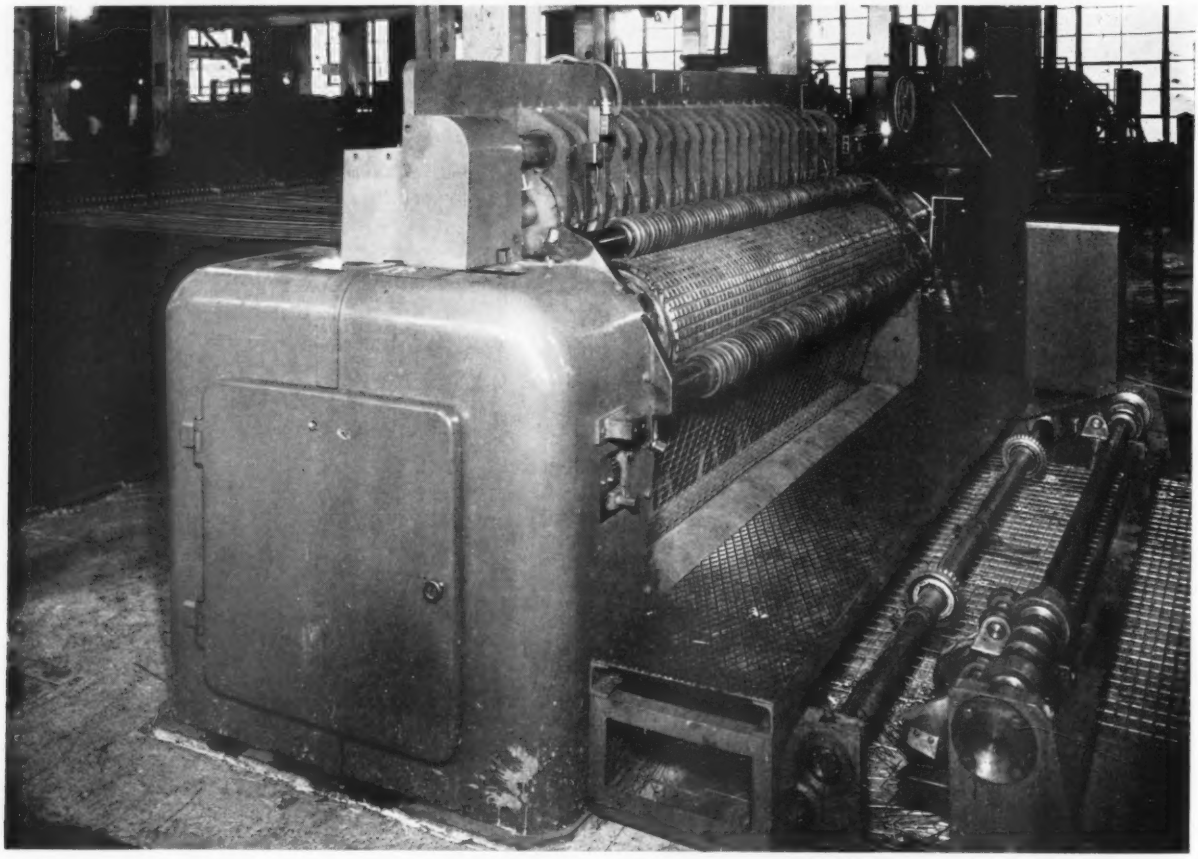
Good reasons for this universal acceptance of Formvar are expressed in the statement of the wire enamel requirements that Formvar phenolic enamel meets.

Formvar phenolic enamel passes industry tests for:
Coating uniformity and smoothness • Abrasion resistance
Heat shock resistance • Dielectric resistance, dry and wet
Resistance to thermoplastic flow • Resistance to solvents
Flexibility • Adherence

Exercise of exacting production controls and active research into variations of the basic formulae keep Formvar a uniform and dependable ingredient in proved wire enamels. Look to Shawinigan and Formvar for continued progress. Shawinigan Resins Corporation, 5309 Monsanto Ave., Springfield 1, Mass.

FORMVAR® *for wire enamels by* SHAWINIGAN RESINS

WICKWIRE BROS. INC. CHOOSES E V G



Actual photograph of Model GZ in Wickwire Bros. Inc. plant—Spacing range: 1" x 1" minimum, enlarging in 1" steps. Wire range: gauges 11 - 16, black or galvanized.

MR. CHESTER F. WICKWIRE, PRESIDENT, SAYS:

"We selected E V G to furnish our new fabric welding plant because of their long experience in engineering and building fabric welding machinery for customers throughout the world. E V G designed, built and supervised the installation of our complete plant—including welder, edge trimming and slitting knives, synchronized nibbler type cut-off shear, fully automatic fabric roll take-up and strip-off."

E V G offers the world's most complete line of fabric welding machinery—four specialized welding plants covering the entire field of welded wire fabric.

The **HEAVYDUTY** (Type G6)—Designed to produce Heaviest meshes (pipe fabric, etc.); wire sizes up to 7/0.

The **UNIVERSAL** (Type G5)—For all standard constructions of road slab-reinforcing, building mesh, etc.—wire sizes from 3/0 to 11 gauge.

The **PRECISION** (Type GZ, shown above)—For fencing and all types of visual mesh. Accurate welding in the lightwire ranges (gauges 11 - 16).

The **HI-SPEED** (Type KFR)—Operating in the fine wire range (gauges 16 - 22). Mesh spacings as small as ½" x ½".

Carefully calculated capacities mean surprisingly low costs.
Specifications and performance data upon request.

Please direct inquiries to

RICHARD E. KLEINHANS
122 E. 42nd St., New York 17, N.Y.
OXford 7-0770

Entwicklungs
Verwertungs
Gesellschaft
Graz, Austria

Maschinen
&
Stahl, A.G.
Zurich, Switzerland

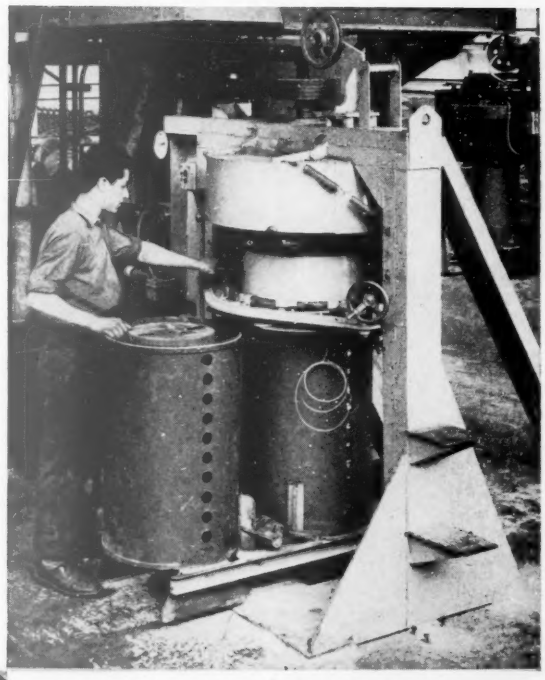
4.800

feet per minute

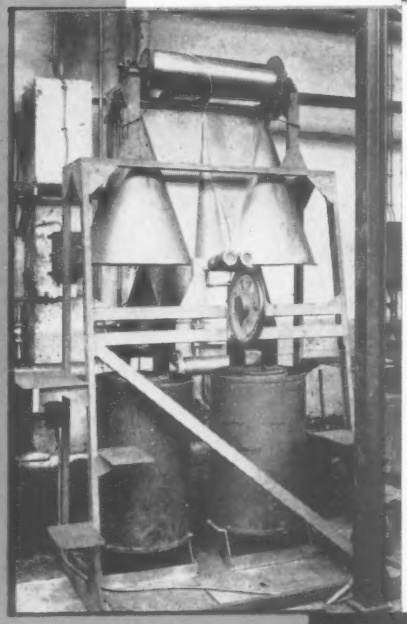
is the speed never reached before of the new continuous

Godderidge

Packaging Unit



Take-up device on a wire-drawing machine.



Double high-speed Pay-Off Stand

OUTSTANDING FEATURES :

- Range of diameter: from 8 to 24 B & S
- Changing of drums at full speed
- Diameter control possible whilst running
- Both-ends of wire accessible, therefore welding and continuous supply of high speed extruders possible by new double

PAY-OFF STAND

For further details write to

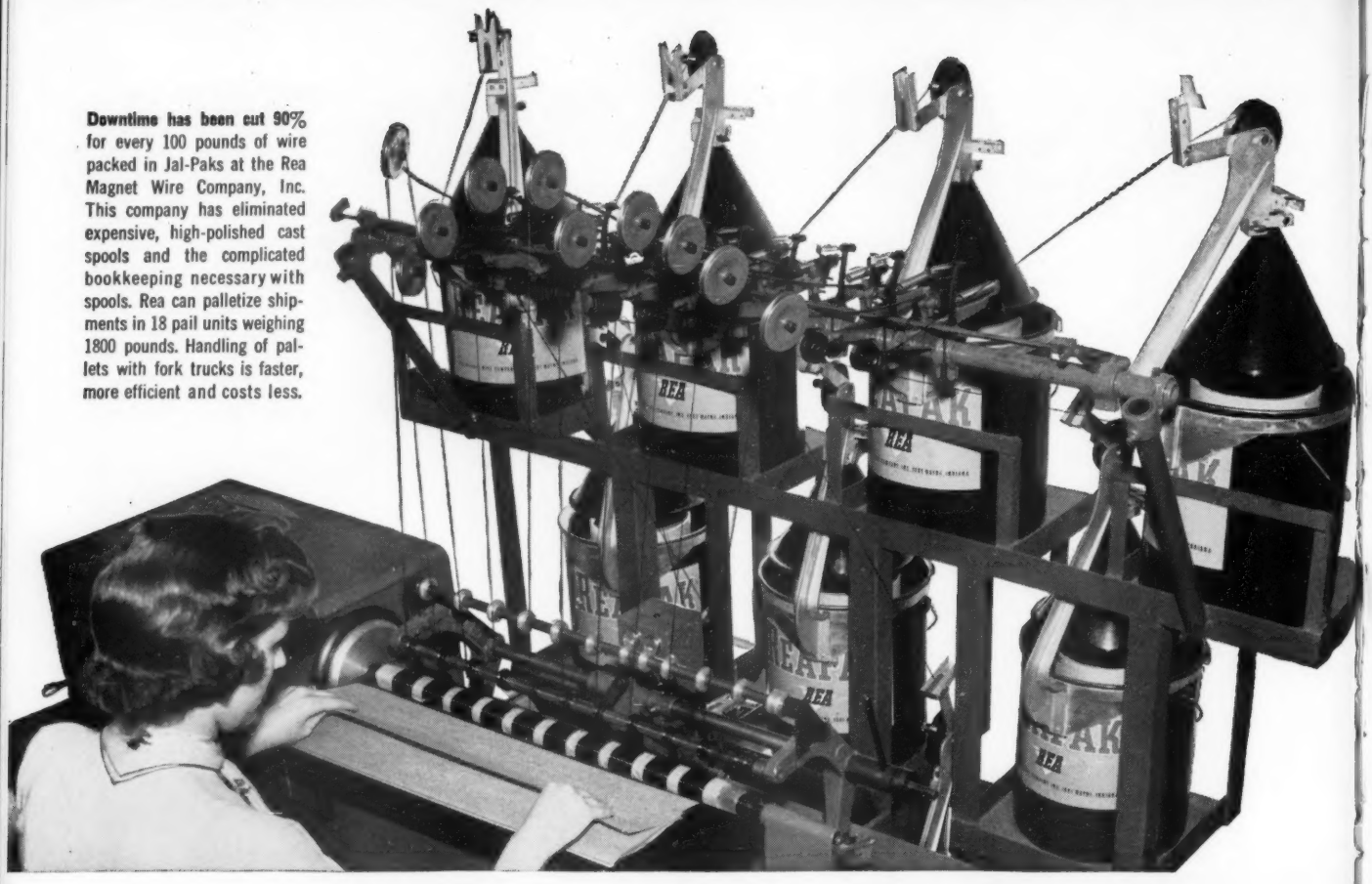
Godderidge

11, avenue Henri Barbusse HOUILLES (Seine-et-Oise)

FRANCE

JEAN MARCOGNE

Downtime has been cut 90% for every 100 pounds of wire packed in Jal-Paks at the Rea Magnet Wire Company, Inc. This company has eliminated expensive, high-polished cast spools and the complicated bookkeeping necessary with spools. Rea can palletize shipments in 18 pail units weighing 1800 pounds. Handling of pallets with fork trucks is faster, more efficient and costs less.



Jal-Pak STEEL WIRE PAILS

improve wire packaging 3 ways...

FASTER PACKAGING results due to advanced design of Jal-Pak. Downtime is reduced as much as 90%. No rethreading, replacing or rejoining is necessary. Rigid cylindrical cores of steel or fiber lower your investment. No deposit or return is required.

BETTER PRODUCT IDENTIFICATION with Jal-Pak pails increases consumer acceptance. Bright colorful pails stand out in storage racks. Product name is readable at a distance.

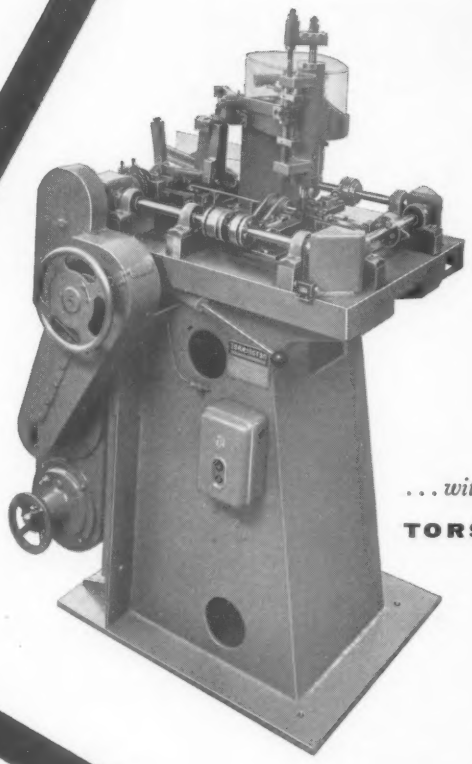
COMPLETE PROTECTION is assured by this steel pail with exclusive rolled, smooth, side seams and smooth surfaces with no obstructions to cause snarling or kinking. Tight closures eliminate deterioration in storage.

Jal-Pak wire pails are now available for brass, copper, steel, aluminum, stainless steel, alloys, welding and soldering wires.

For facts on how Jal-Pak can increase production and sell more wire for you, call your nearby J&L representative, or write direct to the Container Division.

Jones & Laughlin
STEEL CORPORATION · PITTSBURGH
Container Division
405 Lexington Avenue, New York 17, N.Y.

There's room for greater profits



...with the NEW Torrington W3001

TORSION SPRING WINDER

Room — room in which to work — is the outstanding feature of Torrington's new torsion spring winder. This modern, high production machine actually provides the largest tooling area ever devised. In addition, the W3001 offers many other advantages which will help spring-makers boost their production of torsion springs and reduce their costs at the same time.

• Tooling area measures 12" by 18" • Tooling is faster and easier • Tools themselves can be made sturdier and more durable • Shafts on 3 sides plus vertical 2-slide attachment give great versatility in producing complex forms • Capacity extends to 10 turns of .080" wire, thus meeting the great majority of customer requirements for torsion springs • Rugged design means years of trouble-free operation with minimum downtime for maintenance and repairs.

The Torrington Manufacturing Company has built more spring coiling machinery since 1937 than all other manufacturers combined. The knowledge and skill gained while serving spring makers during this period has now been used to create a torsion winder which we firmly believe is the finest ever offered to the industry. If you manufacture torsion springs, this new machine will give you faster, more efficient production and unprecedented versatility to meet your customers' most exacting needs.

Call or write, *now,* for full information.

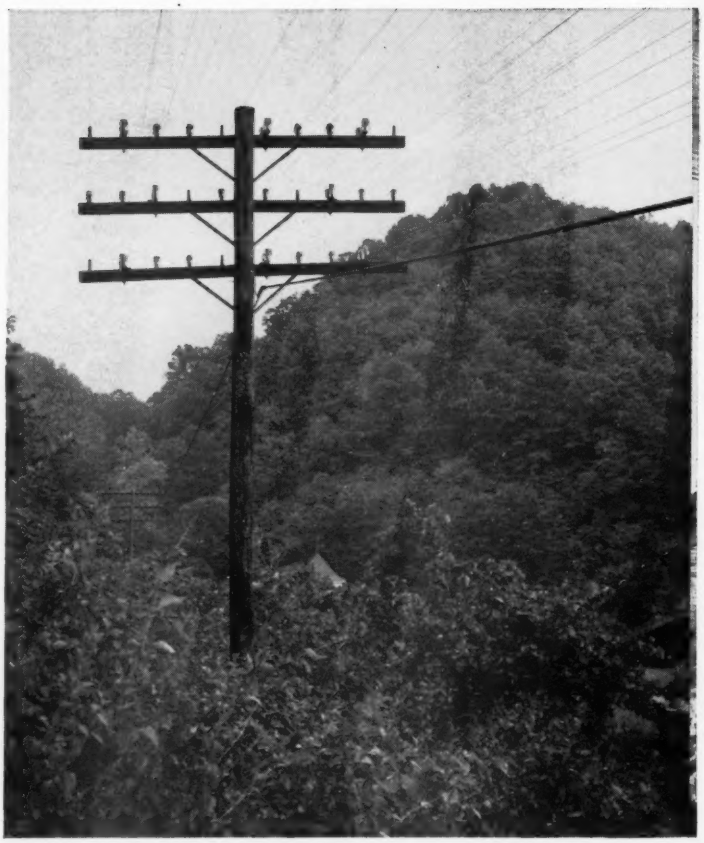
THE
TORRINGTON
MANUFACTURING COMPANY
TORRINGTON · CONNECTICUT
WIRE FORMING MACHINERY DIVISION

Telephone installations show . . .

Where Polyethylene brings savings

INDIANA—A substantial saving in poles is evident in this rural area. The light weight of cable covered with polyethylene permits smaller poles, longer spans, faster installations. In many cases, cable can be strung without a messenger. Splicing has been greatly simplified.

The polyethylene covering has been found highly resistant to ice formation during the sleet storms common to northern Indiana. Where underground installations are made, polyethylene has eliminated the problem of electrolytic action in the soil. Installations in the near future will have much of this cable plowed underground, at a considerable saving.



WEST VIRGINIA—Installation of additional lines here in the mountains is a costly undertaking. Steep slopes overgrown with trees and brush make rights-of-way practically inaccessible to motorized equipment. In addition, holes for poles must often be blasted through rock.

Most of these problems are solved by distribution wire covered with lightweight polyethylene, now used almost exclusively in this area. This cable can be strung on existing poles, often without adding crossarms. Where lines are strung along railroads and near coal preparation plants, the chemical-resistant polyethylene promises protection from chemical fumes.

These field reports from the telephone industry may help you evaluate the economies possible with polyethylene-insulated cable. Taken together, they represent many years of experience with BAKELITE Brand Polyethylene under a variety of terrain and climatic conditions.

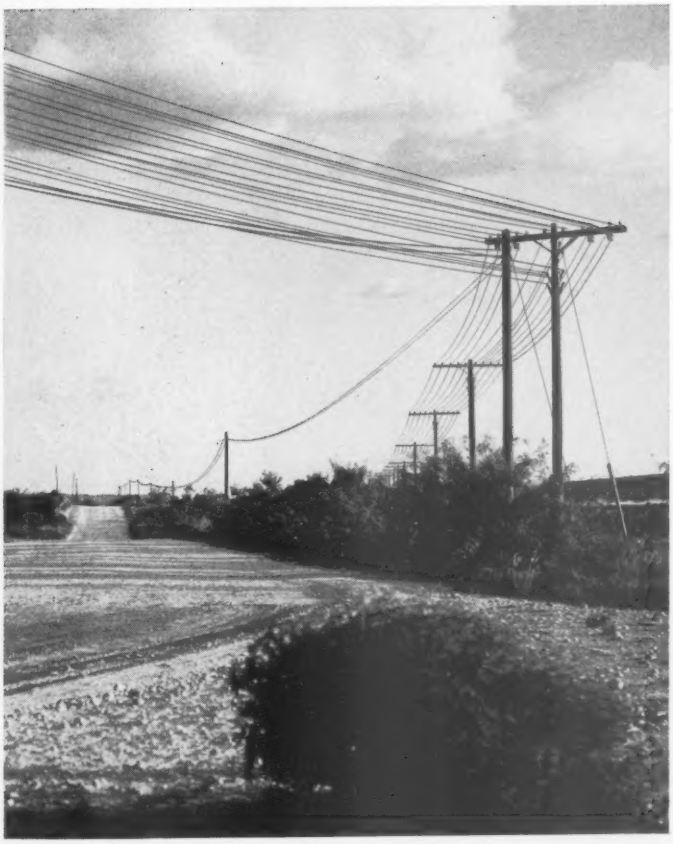
The light weight of this insulation has saved time and effort in installation; in fact, some installations would have been next to impossible with earlier materials. The moisture resistance of polyethylene has minimized weather hazards, while dielectric strength has far exceeded telephone requirements. The strength and flexibility of polyethylene have simplified cable handling.

In addition to telephone applications, BAKELITE Polyethylene is extensivley used in utility line wire and service drop, power cable, coaxial cable, and signal control cable. Besides satisfying REA requirements for plastic-covered telephone wire, it meets applicable IPCEA specifications for power cable, ASA standards for weatherproof wire, ASTM D1238-52T Type II, dielectric materials, and IMSA specifications for fire alarm and signal control cable. For more information, write Dept. RH-196.

BAKELITE BRAND POLYETHYLENE

UNION CARBIDE

BAKELITE COMPANY, *Division of Union Carbide Corporation,* 30 East 42nd Street, New York 17, N. Y.
In Canada: Bakelite Company, Division of Union Carbide Canada Limited, Belleville, Ontario
The terms BAKELITE and UNION CARBIDE are registered trade-marks of UCC.

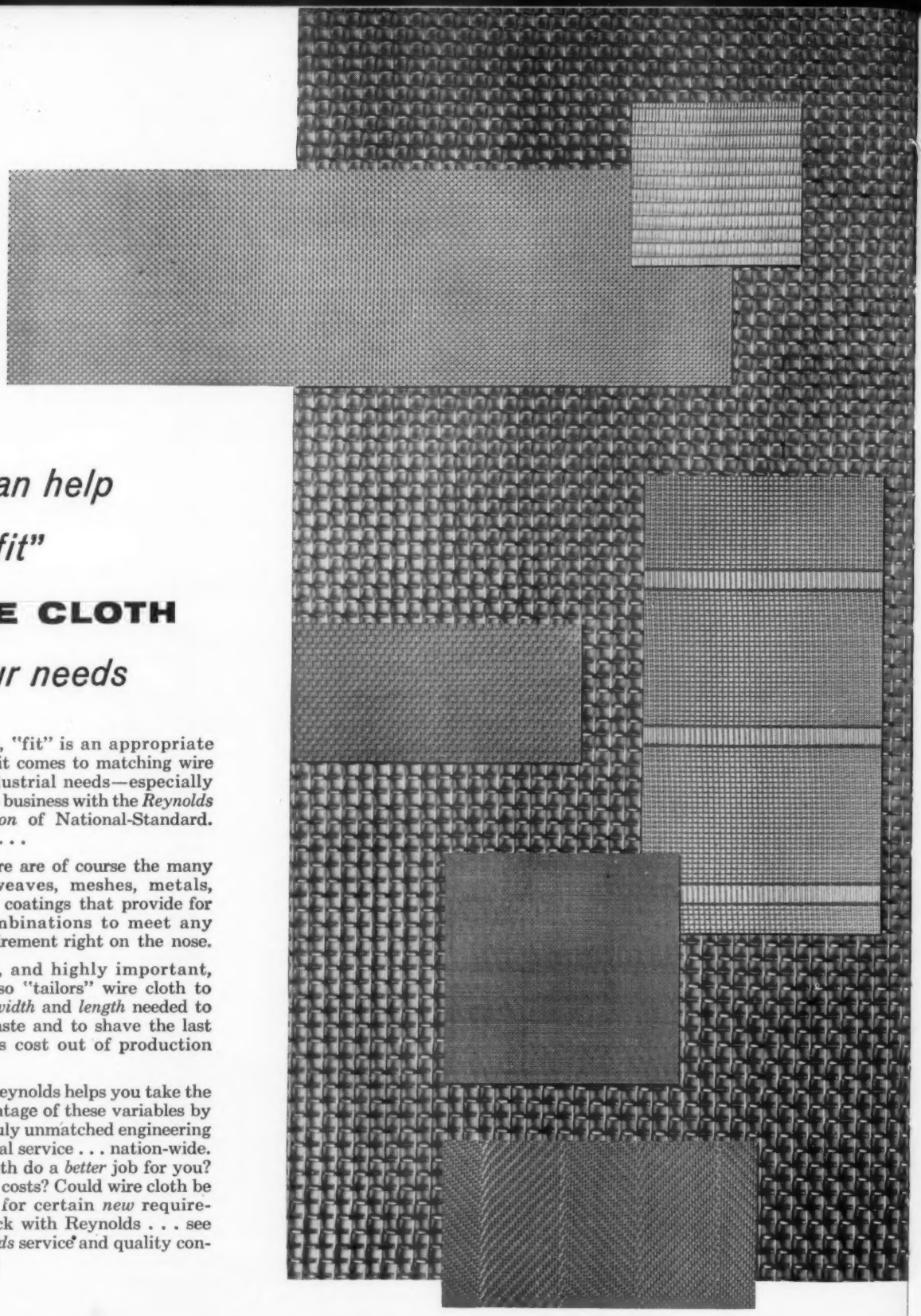


TEXAS—These parallel telephone lines illustrate the savings possible with polyethylene-covered cable. Here, the new lines require ⅓ fewer poles as a result of the extremely light weight of the polyethylene.

Over a million pair-feet of polyethylene-covered cable are in service, and 70 million more are on order for this section, where climate ranges from semi-tropic to semi-desert. The polyethylene jacket must withstand heat, cold, wind, icy and arid conditions. When cable is placed underground, as in urban areas, the polyethylene resists corrosion by stray electric currents in the earth.

VIRGINIA—This terrain combines steep slopes and meadowland, much of it covered by sharp rocks. Problems include the difficulty of placing poles, the need to use only "overhead" rights-of-way at many points, and possible damage to ordinary cable covering if it comes into contact with the stony ground.

Under these circumstances, the lighter, tougher, more flexible polyethylene-covered cable was a distinct advantage. It permitted longer spans to stretch from hill to hill without poles in the fields. It was strung through blocks on the messenger in sections impassable to trucks. There was never any danger of its sagging to the ground and being cut on the rocks.



We can help

you "fit"

WIRE CLOTH

to your needs

These days, "fit" is an appropriate word when it comes to matching wire cloth to industrial needs—especially when you do business with the *Reynolds Wire Division* of National-Standard. Here's why . . .

First, there are of course the many different weaves, meshes, metals, finishes and coatings that provide for infinite combinations to meet any special requirement right on the nose.

Secondly, and highly important, Reynolds also "tailors" wire cloth to the precise *width* and *length* needed to minimize waste and to shave the last bit of excess cost out of production operations.

Finally, Reynolds helps you take the fullest advantage of these variables by providing truly unmatched engineering and analytical service . . . nation-wide. Can wire cloth do a *better* job for you? Can you cut costs? Could wire cloth be the answer for certain *new* requirements? Check with Reynolds . . . see what *Reynolds* service and quality control offers!

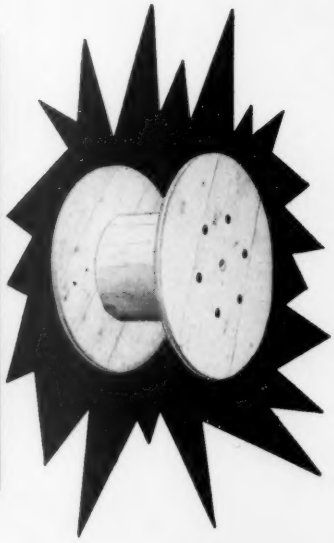
NATIONAL NS NATIONAL-STANDARD Company **STANDARD**

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; *fine wire, stainless, music spring and plated wires* • WORCESTER WIRE WORKS, Worcester, Mass.; *music spring, stainless and plated wires, high and low carbon specialties*
WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • ATHENIA STEEL, Clifton, N. J.; *flat, high carbon spring steels* • REYNOLDS WIRE, Dixon, Ill.; *industrial wire cloth*

YES

NON-RETURNABLE

WOOD REELS IN ALL SIZES
FOR ALL TYPES OF ELECTRIC
WIRE AND CABLE . . . . . .

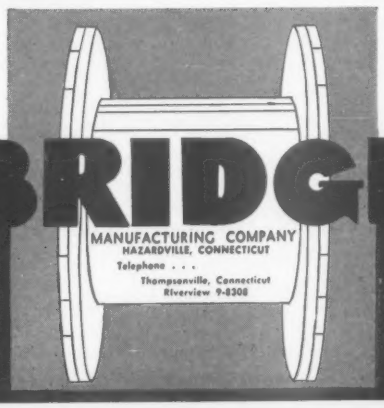


YOU SAVE WITH NON-RETURNABLES

- Reduced Reel Investment
- Less Storage Space
- Lower Freight Costs
- No Repair Costs
- No Return Freight Charges
- No Bookkeeping
- No Deposits Needed
- No More Headaches!!

HIGH SPEED
SHIPPING SERVICE IN OUR OWN TRUCKS

within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels within a few days east of the Mississippi.



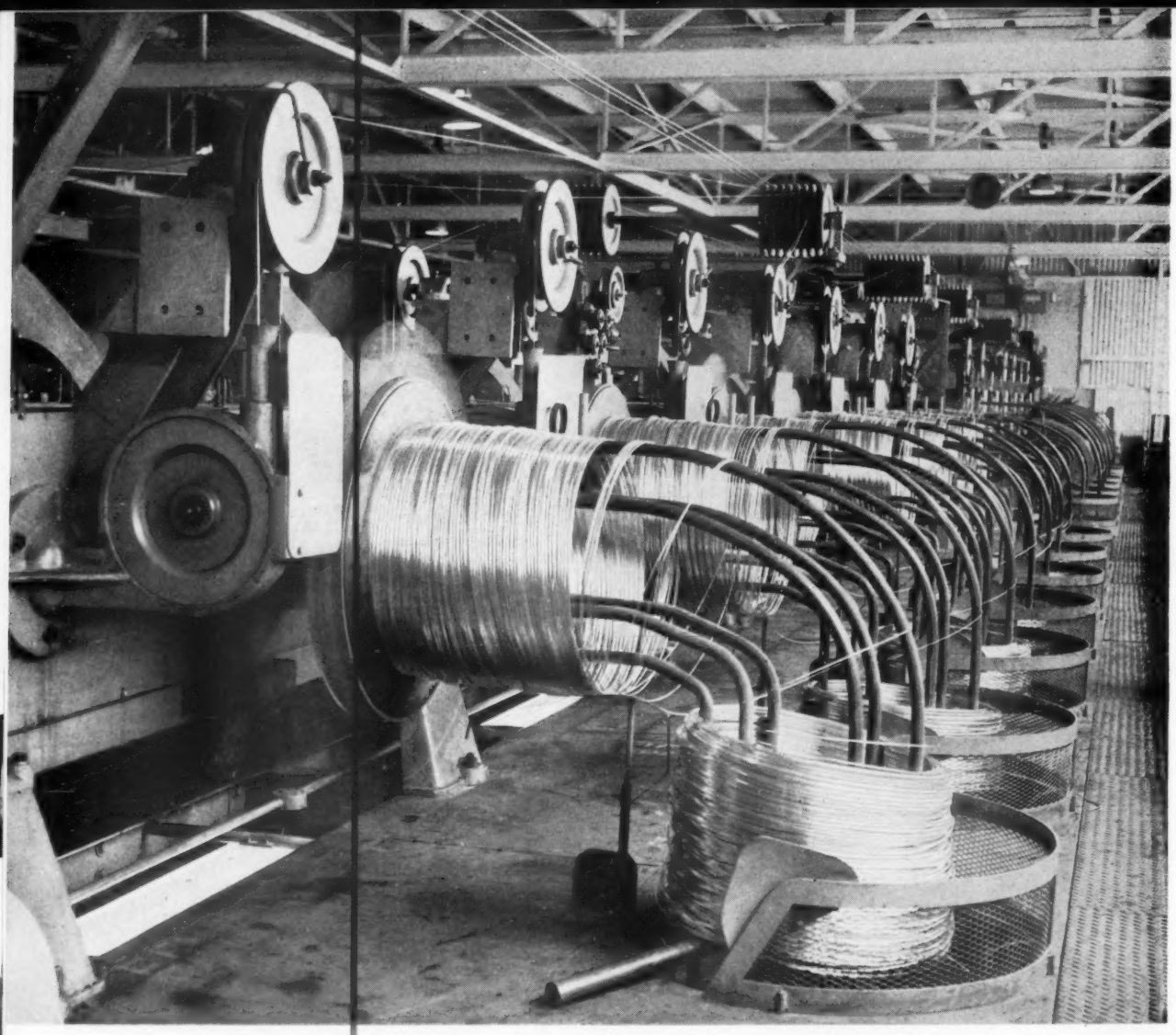
BRIDGE
MANUFACTURING COMPANY
HAZARDVILLE, CONNECTICUT
Telephone . . .
Thompsonville, Connecticut
Riverview 9-8308

NON-RETURNABLE REELS GIVE YOU A DEFINITE PACKAGING COST.

"REEL GOOD . . .

Let us quote on your reel needs. Send us your specifications. Better yet, visit our plant and see how and why Bridge reels are made so well at so low a cost.

WOOD REELS"



"A recent North American Installation"

Take Up Frames for galvanised wires with stationary blocks or convertible to rotating action.

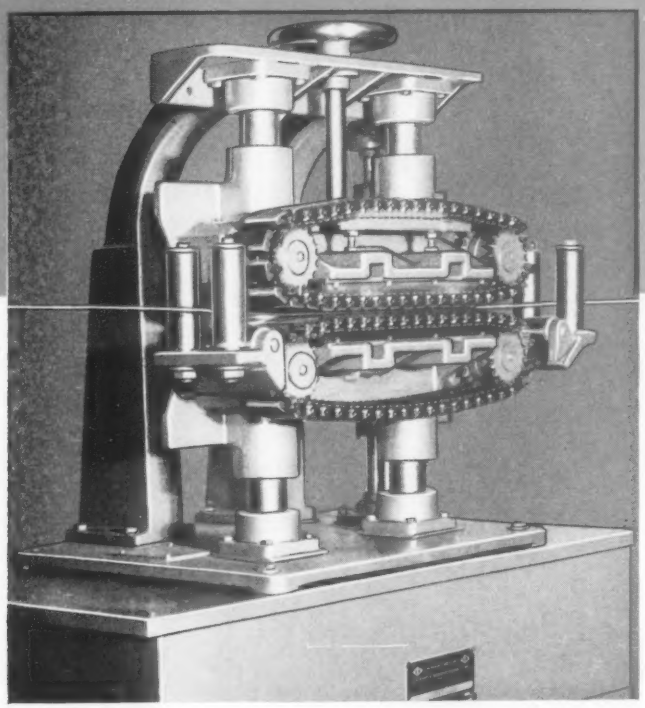
WILHELM BREITENBACH
Maschinenfabrik
und Eisengießerei GmbH
UNNA/Westfalen
Western Germany

BREITENBACH · UNNA

Exclusive Representatives for U.S.A. and Canada
Jedwin of Canada, Limited, 170 Bloor Street West, Toronto, Ontario, Canada
Telephone: WA. 1-3147

ELIMINATE CAPSTANS...

Cut Cable Damage to a Minimum



ENTWISTLE CATERPULLER

PULLS CABLE STRAIGHT WITHOUT BENDING OR DAMAGING WIRE SURFACE

The most improved method of pulling cable through extruders, cablers and strander machines is with an Entwistle Caterpuller. The compact size, low maintenance costs and damage-free tendency of the Entwistle unit makes the Capstan method of pulling cable obsolete. Exacting horizontal pull is applied to the wire as it passes between the two belts of rubber gripping treads. Caterpullers are available in three sizes. Each Caterpuller is designed and built to individual specifications and pulling requirements. A minimum amount of floor space is needed for installation. Maintenance costs are very small compared to other pulling units.

Investigate how you can step up your plant production, reduce cable damage and cut maintenance costs. Write today for details.

CLASS B TYPE B
Vertical Caterpuller

Traction Length	20 inches
Maximum Cable Size	3 inches
Minimum Cable Size	3/16 inch
Pulling Force	700 lbs.*

CLASS C TYPE C
Vertical Caterpuller

Traction Length	40 inches
Maximum Cable Size	6 inches
Minimum Cable Size	3/16 inch
Pulling Force	6600 lbs.*

CLASS C TYPE CHA
Horizontal Caterpuller

Traction Length	40 inches
Maximum Cable Size	6 inches
Minimum Cable Size	3/16 inch
Pulling Force	6600 lbs.*

**Will vary with speeds and type of drive.*

ENTWISTLE
Manufacturing Corporation

1475 ELMWOOD AVE., PROVIDENCE 7, RHODE ISLAND

If

you use

SHAPED STOCK

a

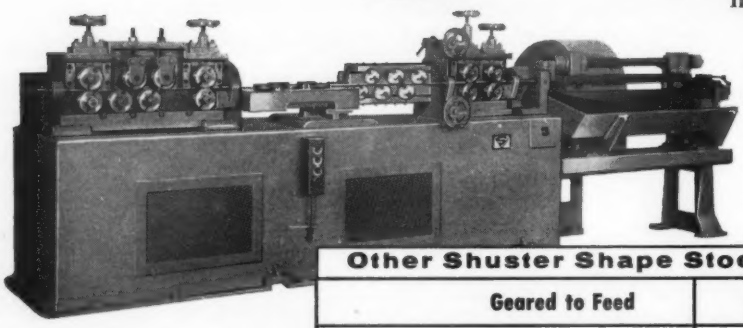
SHUSTER

Shape Stock Straightening and Cutting Machine

Gives It To You Straight!

SHUSTER, the nation's oldest name in wire straightening and cutting, now offers a *complete* line of shape stock machines — first in the field again! For manufacturers of electric motors, wrought iron furniture, and wherever shape stock in volume is needed, SHUSTER offers the economical answer to accurate, straight, square cut stock.

3AVF



Capacity: to 3/8" square, or 3/4" width. Infinite variable speed drive — geared to feed *76* to *228* *feet per minute*. Solenoid operated roll-type clutch — electrically controlled cut-off.

Other Shuster Shape Stock Straighteners

	Geared to Feed	Square	Max. Width
1AF	150 FPM	1/8"	1/4"
1AVF	50-200 FPM	1/8"	1/4"
2AF	125 FPM	3/16"	3/8"
2ABF	120 FPM	1/4"	5/8"

Write today for complete details!

METTLER

MACHINE TOOL, INC.

155 West Adeline Street, New Haven, Conn.

NAUGATUCK Naugapol SPECIALLY-PROCESSED SBR POLYMERS

DRY!...like a mummy

Every drop of moisture was extracted from this mummy long ago by the dryness of the Egyptian desert.

Naugapol® polymers, too, are *dry*—and stay dry—because they are made by a special process that eliminates moisture-absorbing salts.

To make its Naugapols moisture-free, Naugatuck uses acid to replace salt as the coagulant following polymerization. Extra straining and milling further remove water solubles. The result is a rubber especially suited for use in wire and cable insulation, and in mechanical rubber products requiring good flexibility at sub-freezing temperatures.

This is but one of many ways in which Naugatuck and its extensive research and development facilities can help you with specific needs. If you require special grades or special properties in synthetic rubber, call on Naugatuck to supply them.

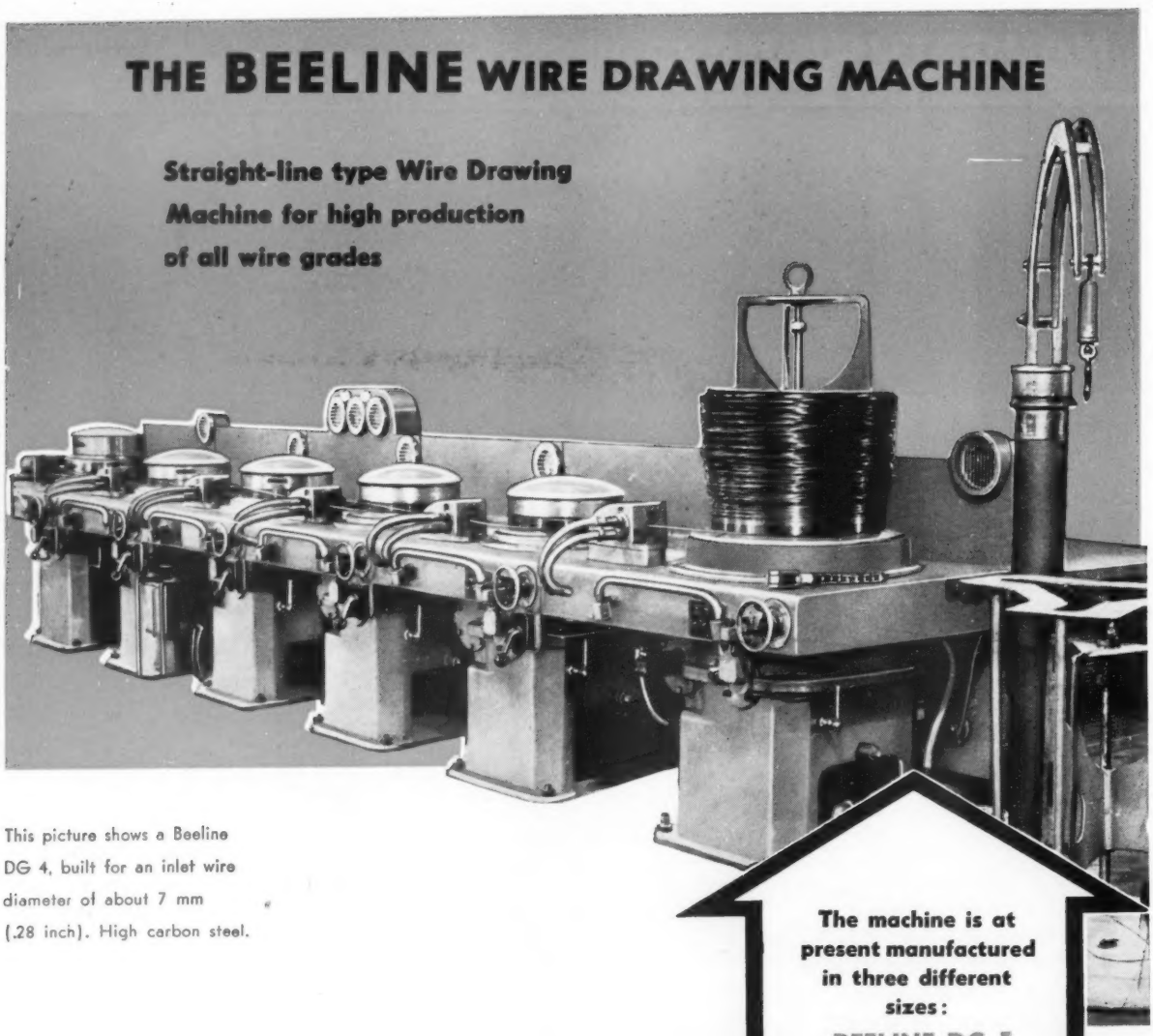
Naugatuck Chemical

Division of United States Rubber Company, Naugatuck, Connecticut

Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • CANADA: Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmira, Ontario • CABLE: Rubexport, N.Y.

THE BEELINE WIRE DRAWING MACHINE

Straight-line type Wire Drawing Machine for high production of all wire grades



This picture shows a Beeline DG 4, built for an inlet wire diameter of about 7 mm (.28 inch). High carbon steel.

Prominent Beeline features:

- Complete absence of slipping between wire and block.
- Direct block-to-block wire running, with automatic speed control and no loops or other mechanical adjusting devices.
- Continuous speed adjustment from almost zero up to maximum.

Let us help you solve your problems. We shall be glad to answer your questions promptly. Don't forget to let us know what wire is to be drawn, the inlet and finished diameter, its intended use, the production required, and all other relevant information (tensile strength of the finished wire etc.). Then we can suggest a machine that is just right for you.

The machine is at present manufactured in three different sizes:

BEELINE DG 5

for heavy wire, about 13 mm. (.500 inch)

BEELINE DG 4

for wire rods, about 7 mm. (.28 inch)

BEELINE DM 3

for wire with an inlet diameter wire of about 3 mm. (.116 inch)

MORGÅRDSHAMMAR

MORGÅRDSHAMMARS MEK VERKSTADS AB • MORGÅRDSHAMMAR • SWEDEN

Cables: Morgårdshammar, Ludvika. Tele: 0240–71100

PERFECT PARTS

by the millions

KEYSTONE XL WIRE STUDY

How KEYSTONE XL Wire turned a problem into a profit for

THE WESTERN AUTOMATIC MACHINE SCREW CO.

DIVISION OF STANDARD SCREW COMPANY—377 WOODLAND AVENUE, ELYRIA, OHIO

This transmission bolt once posed three "impossible" production problems. It used to be cold headed from annealed-in-process, heading quality wire. Almost 100% of the bolts made were rejected because of cracked heads. Die wear was excessive. An objectionable burr was frequently formed, requiring a secondary trimming operation.

Then this progressive firm switched to Keystone "XL" Wire, and all three problems were solved. Perfect bolts are now produced *by the millions.* Dies last longer, due to the excellent coating and surface condition of "XL" Wire. The secondary trimming operation has been eliminated. The bolt is produced on a single stroke boltmaker using 3 position multiple dies with progressive steps to preform, upset and trim.

If you have a problem part to cold head, your Keystone representative will help you analyze it and recommend the wire you need.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

Keystone Steel & Wire Company
Peoria 7, Illinois

COLD HEADING FACTS FOLDER . . . send coupon today! New folder discusses uses, applications, methods, technical facts, wire requirements.

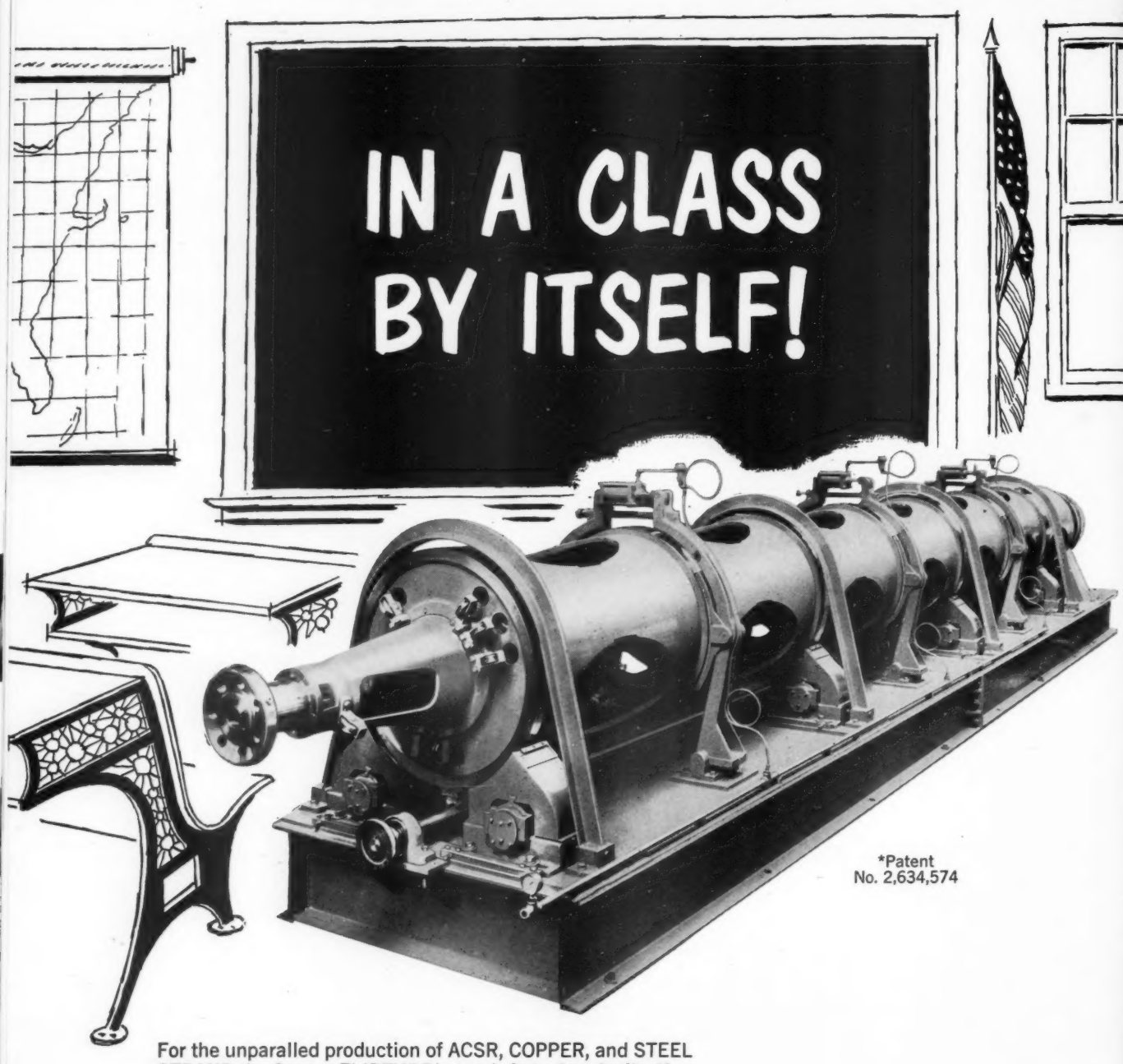
Name_____ Title_____

Company_____

Street_____

City_____ State_____

IN A CLASS BY ITSELF!



*Patent
No. 2,634,574

For the unparalled production of ACSR, COPPER, and STEEL STRAND the Syncro ELIPTUBE* stands **in a class by itself.** Used extensively in wire and cable mills, the Syncro ELIPTUBE is designed to accommodate 6″ - 8″ - 12″ - 16″ and 22″ diameter bobbins. Syncro's tubular stranders assure high speed performance, with uniform high quality. Like all Syncro equipment the Syncro ELIPTUBE is designed for leadership and engineered for greater profits. To meet your stranding requirements, see Syncro today.

SYNCRO MACHINE COMPANY
Perth Amboy, New Jersey, U.S.A.
affiliated company: WINGET SYNCRO Ltd. Rochester Kent, England

Better Machinery for the Wire Industry

SYNCRO®

WIRE DRAWING MACHINES • DIE STRINGERS • CONTINUOUS ELECTRIC ANNEALERS • PAYOFFS • CAPSTANS • WIRE INSULATORS • HEAVY DUTY TAKEUPS • TAPERS • SPECIAL MACHINERY

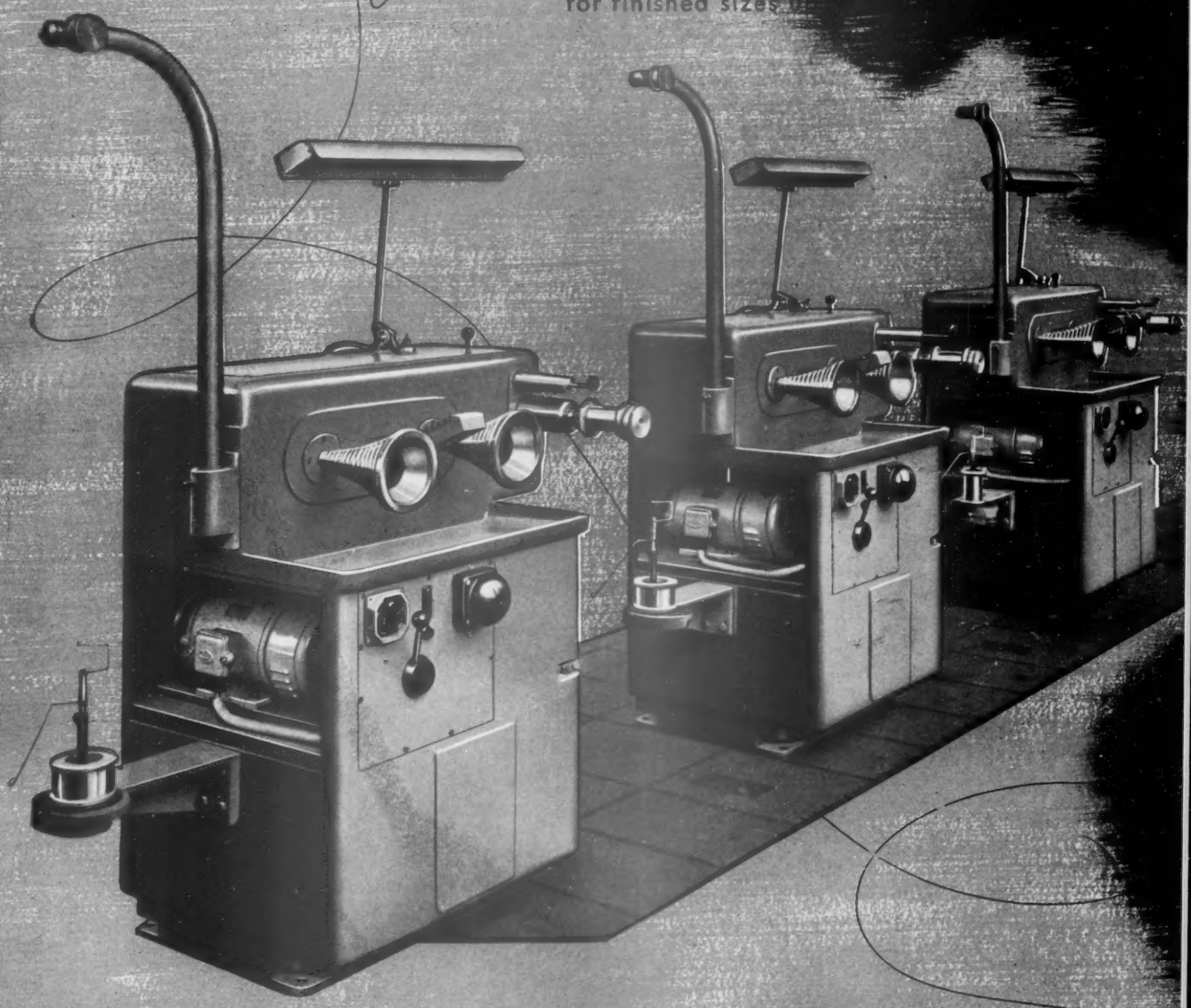
HERBORN

Wire Drawing Machines

for fine wire

MODEL F VI

for finished sizes



MASCHINENFABRIK HERBORN BERKENHOFF & DREBES A.-G.

OUR SPECIALITY: MACHINES FOR THE WIRE INDUSTRY · IRON FOUNDRY

HERBORN (DILLKREIS) GERMANY

Sole Representative in the U. S. A.:

KURT ORBAN CO., Inc., 34 Exchange Place, JERSEY CITY 2, N. J

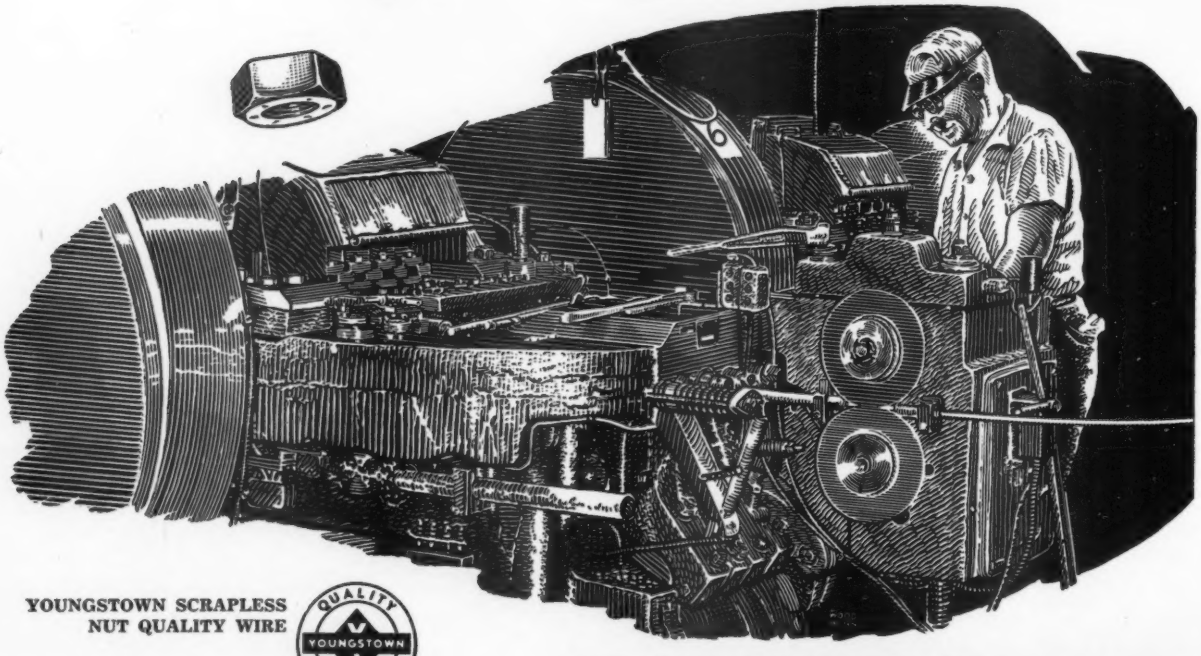
For over 50 years, leading manufacturers in all the major industries have used Gripco lock nuts to simplify production, lower manufacturing and maintenance costs and to improve the durability of all kinds of assembled products. To maintain this enviable reputation for outstanding product quality, the Grip Nut Company of South Whitley, Indiana, uses quality-controlled Youngstown Scrapless Nut Wire and Bars as basic raw material.

Because it comes to your plant free from all piping, injurious seams, laps, die marks, internal tearing and cupping, and non-metallic inclusions —Youngstown Scrapless Nut Quality Wire will provide increased production with fewer rejects which adds up to a healthy over-all profit boost. Also, its smooth coating extends die life thus minimizing costly die replacements.

YOUNGSTOWN SCRAPLESS NUT WIRE

Helps Maintain Quality of GRIP *Lock Nuts*

Youngstown Scrapless Nut Quality Wire is provided in special resulphurized steels as well as in standard AISI grades. Cold Heading Bolt Wire, of the same high Youngstown quality, is also available in all standard carbon and alloy analyses. Why not phone or write to our nearest District Sales Office for additional information or metallurgical assistance?



YOUNGSTOWN SCRAPLESS NUT QUALITY WIRE

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

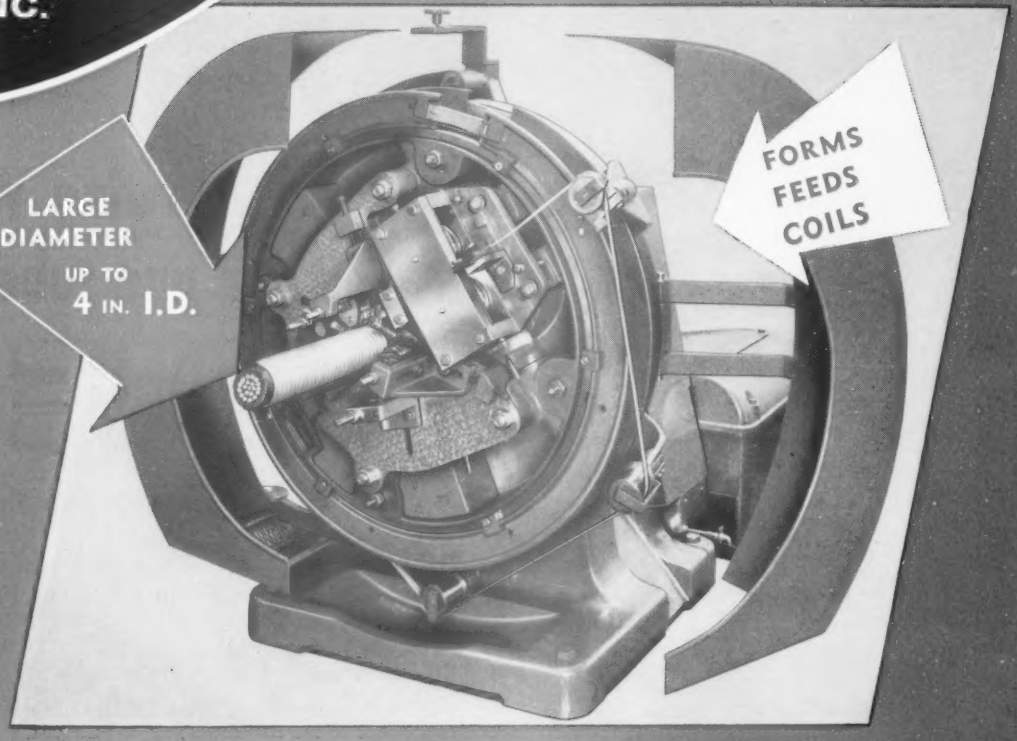
District Sales Offices in Principal Cities

SLEEPER & HARTLEY INC.

4" CABLE ARMORING MACHINE Series A497

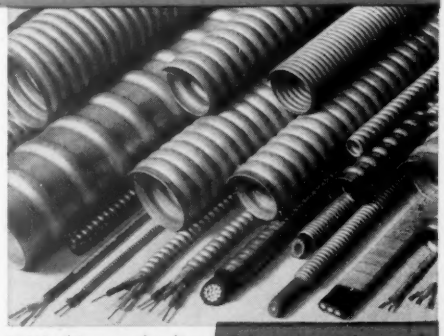
LARGE DIAMETER UP TO 4 IN. I.D.

FORMS FEEDS COILS



This top-quality S&H 4" cable armorer is the only machine of its kind that forms, feeds and coils in one operation. It is used extensively for armoring large diameter cables at a lower production cost.

This machine makes possible continuous production, since the armor does not rotate as it leaves the machine and an auxiliary strip spooler loads spare reels while the machine is in operation. It is another example of S&H's advanced engineering "know-how" that has made Sleeper & Hartley the leader in the field of automatic coiling machinery.



S&H builds a complete line of machines for armoring all sizes of cable up to 4" in diameter.

Other types of special Sleeper-built machines produce square-lock and interlock flexible tubing.

Write for latest information...

SLEEPER & HARTLEY INC.

BOX 1249, WORCESTER, MASS., U. S. A.

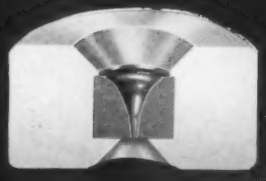
EST. 1911

ORIGINAL MANUFACTURERS OF UNIVERSAL SPRING COILERS

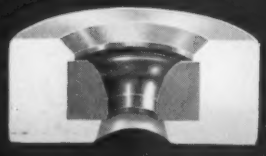
For Drawing Wire, rod, bar and tube . . .

V-R DIES

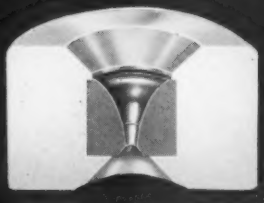
Rough Cored—Standard Hole and Nib Sizes



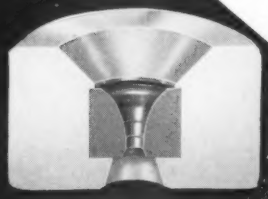
WIRE DIES
Rough cored sizes from .004 to .028



BAR AND TUBE DIES
Rough cored sizes from .275 to 2.725



WIRE AND ROD DIES
Rough cored sizes from .015 to .200



ROD AND TUBE DIES
Rough cored sizes from .230 to .725

Time and money saving V-R rough cored dies employ an exclusive grade of carbide specially developed and manufactured by V-R to deliver maximum life. An improved method of die assembly plus a cylindrical nib insure a high degree of concentricity, and maximum strength.

You can count on V-R die quality and design . . . V-R originated preformed back relief for drawing dies. Costly die room roughing operations were eliminated over the entire range of hole sizes, saving wire mills time and money. Die men found it easier too, to produce high quality finished dies. V-R has also been foremost in producing rough cored dies in the smaller hole sizes .004 and .010.

Write today for Die Catalog VR-461. It contains complete data on the V-R round dies illustrated and also lists rough cored square and hexagon shaped dies and custom-cored rectangular dies.

SEND FOR CATALOG TODAY

Vascoloy-Ramet Corporation

D-613

SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION
894 Market Street • Waukegan, Illinois
MANUFACTURERS OF CEMENTED CARBIDES • TANTUNG CAST ALLOYS • CUTTING TOOLS • DIES

The Wire Outlook

When will the spiral of inflation end? Some observers feel that it has entered upon its last stages, following the latest round of wage and price increases of the summer.

Money is harder to borrow, defense appropriations appear to be headed for major cuts, stocks of goods are rising faster than sales, it is becoming harder to sell the output of industry and although employment is high, it is more difficult for men to find the kind of work wanted. People, too, appear less eager to acquire large debts.

New housing units are moving more slowly and housing stocks are down 13%. Car sales are slightly better—some 200,000 more units than in the first 6 months of 1956—and appliance sales, particularly TV sets, are somewhat up, but manufacturers quite generally are feeling the resistance to the higher prices.

However, no real set-back is anticipated—just a gradual leveling off in the tempo of business. FHA mortgage terms have been eased in the hope that this will offset the effect of arms cuts. Elsewhere, money will be kept "tight."

With all this, the output of goods continues at a high rate, even though it seems clear that production has reached its peak. Personal incomes are up, with a tendency noted to put more of it into savings accounts. By the end of the first half personal incomes had hit a rate of 343.8 billions for the year—17 billions higher than for June, 1956. Most of the gain was noted for salaried employees, although wages are up too. Farmers' incomes are up 2½% over 1956.

Gross national product for this year is expected to climb to $430 billions, as against $412 billions for last year. Steel output, running below capacity, will equal or slightly exceed that of 1956.

Aluminum prices took another hike—about 4%—to 28.1 cents per pound for ingots. Long range prospects for aluminum use are rosy. 4.1 billion pounds were produced in 1956. It is predicted that in 8 years demand will require 8.4 billion pounds, much going to meet the electrical industry's needs. Copper, on the other hand, was reduced early in August to 28.5 cents per pound delivered. Steel prices now should hold steady until next summer, after which they are anybody's guess.

Third quarter buying of wire is expected to become better, as finished wire product stocks are low and an improvement in demand is anticipated. Order backlogs are presently light. Fastener and upholstery spring sales are slow, with producers operating at around 50% of capacity. Wire rod production is lagging at about 25% under the general level of business. Reinforcement wire sales, somewhat set back by the cement strike, are again showing signs of satisfactory activity. Barbed wire production is slow in the face of high imports. About 60% of this product consumed is being imported. Manufacturers wire should take a spurt when the radically new 1958 cars get into production.

An important move in Congress to cut Federal spending is to be noted in the introduction of a bill by a group of 33 Congressmen headed by Rep. Lipscomb (R.-Calif.). This would give Congress considerable control over bureaucratic spending, something that has been needed for a long time in view of the fact that our bureaus have been pretty much a law unto themselves. If such a measure is passed, it should have an effect on the 1958 budget.

While the wire industry is running behind the general level of business activity, industry as a whole is showing good basic strength. Our wage levels are high as compared with those in other parts of the world. Production emphasis therefore should be on ever higher degrees of automated operations.

Edmund Duval Sickels

EDITOR

Steelskin

Manufacturers of

POWDERS, COMPOUNDS GREASES & COATINGS

for

WET & DRY DRAWING

of

WIRE, TUBING BARS & SHEETS

NON-FERROUS FERROUS

NEW "STEELSKIN" GREASES

"STEELSKIN" AB and "STEELSKIN" ABC Lubricant Powders turn into a grease ball when used in the ripper die box on continuous machines.

Quoting from our reports, the following "Coat Hanger" practice is actually being used:

"Lightly limed rods
AB in ripper die box only
Ripper die 18° angle
Last two 16° angle
Five holes on Vaughn to .097 finishing 1,000 FPM

Note: Customer claims tighter die angles on last two dies give the desired finish. One plant using **ABC** has all 16° angle dies on Morgan Machines."

"STEELSKIN" 2735 and "STEELSKIN" 1501 Bright Wire Greases are new developments for drawing plating quality wire and clean wire for welded mesh.

"STEELSKIN" has many other greases to fit the needs of individual plants producing special finishes.

AND REMEMBER . . . you are entitled to **STEELSKIN** "on-the-job" service. This service is backed by nearly 50 years' experience in the field of wire drawing lubrication.

R. H. MILLER

Company, Inc., Homer 1, N. Y.

STEELSKIN

First in

LUBRICATION!

First in

SERVICE!

Since 1909

FILL IN COUPON AND MAIL TODAY!

Please send more information on

STEELSKIN PRODUCTS

We draw: ☐ Steel ☐ Dry ☐ Sizes .....
☐ Copper ☐ Wet .....
☐ Other — Specify .....

Please have representative call.

Name ..... Title.....

Company .....

Address .....

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 32 SEPTEMBER, 1957 No. 9

A Notable Wire Rod Mill in Sweden

by L. W. Passmore
Special Correspondent
England

A wire rod mill incorporating several notable features is in operation at the Swedish steel works Fagersta Bruks A.B. In the following a brief description is given, featuring novel design details that differ from conventional types of similar mills. The demand for very close tolerances was one of the decisive factors in its planning.

★ ★ ★

Another consideration was the desire to be able to provide for wide and varying production, especially of high-quality wire requiring good surfaces and close tolerances, but in addition, facilities for producing rolled wire of a lower grade were also required.

★ ★ ★

The plan of the rolling mill can

Because this rod mill departs from conventional design in a number of features in order to produce rods of closer than normal tolerances and provide greater versatility, the publishers of Wire and Wire Products feel that a description of it will be of considerable interst to many of our readers. The author acknowledges the assistance of the ASEA Journal for material used in the article.

can be seen, in principle, in Fig. 1, where the figures 10—19B denote the various rolling stands, each one with its own driving unit. At Fagersta, it was decided to roll only one wire at a time with loops between the various pairs of rolls. It thus became imperative to adopt a high rolling speed for the final stage of the process and to work with large wire-coil weights if production was to be satisfactory. By limiting the size of the loops it has been possible, in spite of the heavy coils weights (about 250 kg, or 550 lb.) to keep the difference in temperature between the beginning and end of the wire as low as about 20°C. Any desired final rolling temperature can be maintained, even at speeds up to 25 m/s (82 ft/sec). New and valuable experience has been gained in designing the repeaters for both oval and square sections, and the difficulties that arise at high rolling speeds have been overcome most satisfactorily.

★ ★ ★

There are no "roller stands" in the traditional sense, but the roll assemblies are so designed that they can be easily loosened and lifted out so that readjustments and the changing of rolls can take place under supervision in a work-

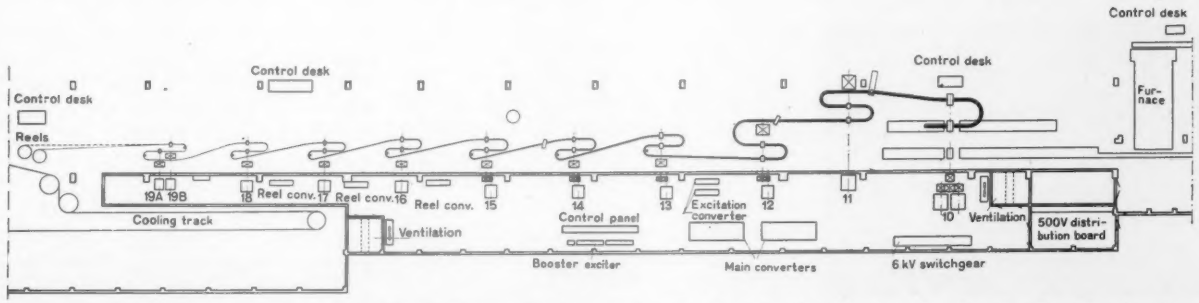


Fig. 1—Plan of rod mill. Courtesy of ASEA Journal, Västeras, Sweden.

shop instead of on the rolling mill premises. By this means, the care and maintenance of the rolling mill is improved.

* * *

For this wire rod mill the well-known firm ASEA have supplied not only the complete electrical equipment, but also all the reduction gear, pinion gears and electro-rollers. An attempt has been made to make operation as automatic as possible in order to dispense with heavy manual work. Only one man is required at the furnace and one at the reels in order to look after the actual running of the mill after a rolling programme has been set. However, generally speaking, the labour force is not usually so small, since use normally is also made of one man at the control desk for stand 10, and, in addition, a man is quite often placed at the control desk opposite stands 17 and 18 in order to supervise rolling in the final pairs. Naturally, there is also the mill adjuster whose work is, however, confined to running adjustments and track changing.

* * *

The electric power is supplied in the form of three-phase alternating current, 6 KV, 50 c/s.

* * *

All the rolling stands are driven by D.C. motors supplied from two converter sets, each consisting of a synchronous motor and two D.C. generators. The rating of each of the four generators is 1150 kW. The synchronous motors are designed for direct connection to the 6 kV switchgear, which contains a starting transformer common to them both. Starting is automatic and is by means of an operating switch on the control board. (Fig. 2).

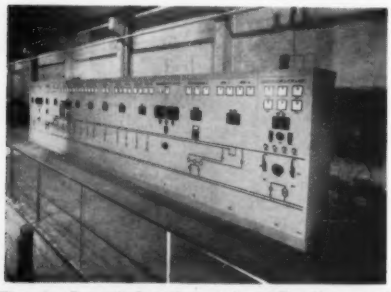


Fig. 2—Control board contains all relays and measuring equipment.

In order to facilitate supervision, each circuit-breaker and isolator has a symbol that automatically shows its position on the mimic diagram. This diagram is placed above the control desk for the continuous rolling mills (Fig. 3), by which means the personnel in charge can obtain a clear picture of the connection obtaining for a certain rolling programme.

Fig. 3—Control desk for continuous stands, 12 to 19 B.

All the relay equipment and the major part of the indicating and metering equipment has been assembled in a control board, the appearance of which may be seen from Fig. 2. The mimic diagram at the front clearly and simply depicts the plant, and the operating switches and the electrically operated position indicators included always correctly reproduce the positions of the circuit-breakers and isolators.

* * *

There is on the control board, a comprehensive set of reading instruments for the central supervision of the plant. However, it is not the intention that an operator should always be in the engine room, but that supervision of the plant should take place with the aid of indicating relays, for all the more important causes of faults, concentrated in signal stations on the various panels. In addition to signals for electrical faults, there are fault signals for all the bearings in the converters, for the major motor and gearing bearings and equipment for measuring the temperature in important bearings. The switches needed for starting the main converter, the excitation converter, the fan motors, etc., are to be found on the control board.

* * *

All the main motors and reduction gears are set up inside the engine-room. On the other hand, all the pinion gears are out in the rolling-mill shop. However, the pinion gear for stand 10, which is combined with the reduction gear, constitutes an exception. This gear is of symmetrical type with two 750 h.p., D.C. motors working in parallel, and the central pinion is directly connected to the slow-running gear-wheel of the gearing. By this means, a very stable, and, at the same time, space-saving combination of the driving mechanism for the rolling stand is obtained. The distribution of the output over two equal motors, each one working on its own pinion in the gearing, implies the advantage that if one of the motors should be damaged it is, in any case, possible to run the rolling mill at reduced output with the other motor. In this case, it has also been possible to arrange that a motor of exactly the same type can be used as for stand 11. As will be seen from Fig. 1, there is a long shaft for this stand running under the floor of the rolling-mill shop between the motor and the pinion gear, which latter also provides some speed reduction. It has been borne in mind throughout when designing the pinion gears that all the jack shafts from the motors or the gears should go under the floor of the rolling-mill shop so that a satisfactory inspection way could be obtained in the rolling-mill shop next to the engine-room wall. All the pinion stands are therefore driven via the under-pinions and practically all are of the four-high type. Stand 18 in Fig. 4 is an example of this.

* * *

It was possible to select for all the stands from 12 to 18 inclusive exactly the same driving motors rated at 350 h.p., 400-1,000 r/m, and adaption to the most suitable roll speed is carried out in stands 12-15 by means of separate gears, while for stand 16, the speed of the motor corresponds with the speed of the stand. In the last four stands, the speed of the motors has been geared up, but the ratio is so small that it has been possible to achieve the increase in speed within the pinion gears quite simply by slightly increasing the di-

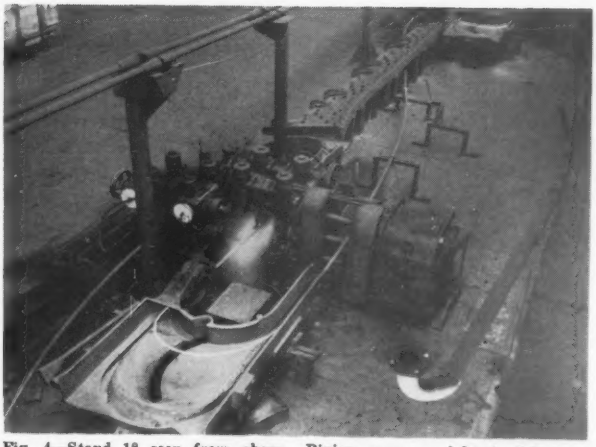


Fig. 4—Stand 18 seen from above. Pinion gear on right is driven on underpinion by a shaft under the floor. * * * * * * *

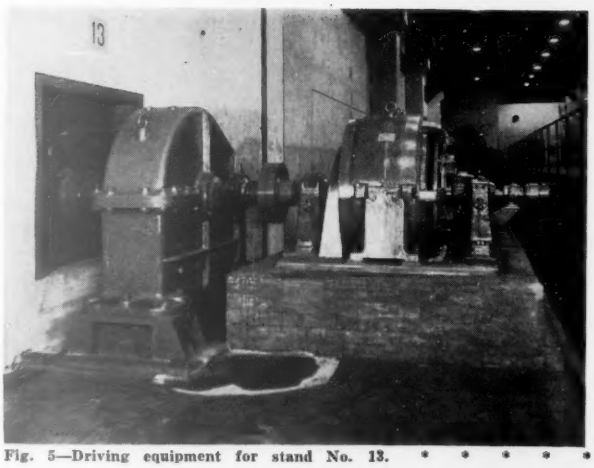


Fig. 5—Driving equipment for stand No. 13. * * * * *

ameter of the bottom driven gearwheel.

★ ★ ★

In each of the stands, numbered 11 to 18 inclusive, the same driving motor is used for a complete alternating two-high stand with two pairs of rolls. This calls for exact mechanical calibration if the increase in the loop between these two pairs of rolls is to be as small as possible during rolling. However, the last alternating two-high stand is powered by two motors, each rated at 200 h.p. The advantage of this is that the pairs of rolls for the last two passes can be calibrated, bearing in mind only the tolerances of the product, since the increase in loop size is checked by means of the electrical loop-regulating device between the pairs of rolls.

★ ★ ★

As an example of the driving equipment for stands 11-18, Fig. 5 shows the machinery for stand 13, in which the toothed coupling on the outgoing shaft end of the gearing may also be seen. All the stands from 11-15 inclusive have ASEA toothed couplings.

★ ★ ★

After leaving stand 19B, the wire is wound up on one or other of the two reels alternately. Each of these reels has two driving motors with a combined output of 110 h.p., which output is, practically speaking, entirely determined by the fact that the reels have to be able to accelerate from standstill to running speed in a short time, although also by the fact that the reels must rapidly follow the variations in speed of the final pair of rolls. Becaue of the loop regulation, the final pair of rolls varies somewhat in speed and if the wire reels do not follow these variations sufficiently quickly, winding is made impossible at these high speeds and heavy coil weights. The fly-wheel capacity of the reels with their coils of wire is very great in relation to that of the rolling mill and therefore a large motor output is required for the reels if their speed adjustment is to be sufficiently rapid. Each reel has its own Leonard converter, the generator output, like the motor output, being provided by two machines. Speed regulation is achieved by using an extremely rapidly acting regulator to govern the generator voltage.

★ ★ ★

Because of the arrangement of the rolling stands out in the rolling-mill shop, the engine-room is very elongated and it might well seem as though the space were more than adequate. However, the intention is that duplication is to take place as from, and including, stand 12, and that the driving sets then added shall be placed in between the existing ones. This also implies the addition of a third converter and the extension of the switchgear and control board. This was borne in mind when planning the engine-room. After these intentions have been carried out the space in the engine-room will be fully utilized.

The rolling-mill motors are started and their speed is set from the main control desk. There is a good view from this point over the greater part of the mill and from here it is possible to control by means of handwheels the position of the loops so that a suitable loop length is maintained. Further, there is an instrument for each loop regulator which shows the position of the loop. After the setting has been made and tested for a certain rolling programme, it is not necessary for anyone to stand at this desk all the time since rolling is carried on quite automatically. At stand 10 there is another desk which allows of hand operation of the auxiliary machines for this stand, although operation can also be automatic. It is the same with the handling of billets before and after the furnace.

★ ★ ★

The billets are placed in large piles in special pockets from which they are fed, one by one, on to a roller track which transports them up to the billet pusher at the furnace. There the billet is placed in a suitable position, the billet pusher thrusts in the billet so far that a billet that has been heated through falls down on to the roller track on the other side of the furnace and is carried forward to a suitable section of the roller track where it is allowed to wait for a few seconds until the rolling of the billet immediately before it is finished in the first pair of rolls. The roller track is then started and the billet is rolled automatical-

ly a few passes backwards and forwards in pairs 1 and 2, whereupon the tilting table and special transfer devices move it from track to track. As from the last pass in pair number 2, rolling takes place by means of repeaters and the billet is held back for a moment on the tilting table before this pass so that the end of the previous billet is able to get a sufficient distance ahead. All the chain of auxiliary devices which lead the billet from the pockets and carry out the roughing operation can be set in motion by means of a single impulse from the control desk at stand 10. However, for each auxiliary motor means are provided for manual operation, both from the control desk at stand 10 and from a control desk by the billet pusher.

★ ★ ★

In the roller track from the furnace to the roughing mill and also in all the roller tracks included in the mill, the rollers are individually driven. The three ASEA standard types of electro-roller are being used in various sections of the plant. The rollers in those roller tracks in the mill itself which are placed next to the rolling mill are designed with oil-lubricated, overhung gears, while at less exposed places, the type with a grease-lubricated, overhung gear has been selected. In the major parts of the transport roller tracks from the furnace, the rollers are of overhung design, being carried by the out-going shaft end of a geared motor with a reinforced gear housing, as will be seen from Fig. 6. It should be pointed out that these rollers are considerably cheaper than electro-rollers with two bearings and they are particularly suitable for roller tracks of this type, where the loads are only moderate.

★ ★ ★

A point of considerable interest in this wire rolling mill is the regulation of the speed of the main motors in the continuous part of the rolling mill. It was probably the first time that a rolling mill was planned for regulation by means of transductor regulators, and the experience gained of this

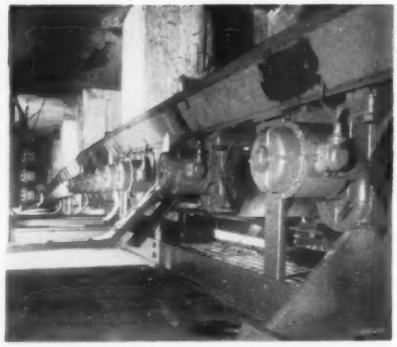


Fig. 6—Part of furnace roller track.

type of regulation was so encouraging that practically all later plants have been designed with regulators of this type. The completely static regulator contains no parts with a limited length of life and therefore needs only a minimum of attention.

★ ★ ★

For regulating the speed of the mill motors, the transductors have, in this case, been combined with suitably adapted booster exciters and stabilizing circuits, by means of which very rapid and stable regulation is obtained in spite of the fact that regulation of the motor speed takes place through variations in the motor field current.

★ ★ ★

Even in the early stages of planning, however, it became clear that it would not be possible to keep the loop lengths constant merely by controlling the speed by means of the tachometer generators of the motors. An accuracy of measurement of, for example, ½ per cent would, in the case of a rolling speed of 20 m/s (65 ft/sec.), mean that the size of the loop would alter at a rate of 10 cm/s (4 in./sec.), which means that the loop would rapidly be forced out over the edge of the repeater or pressed against the inner rim with undesirable stretching of the wire as a result. Since the control voltage, which gives full transductor control action, is 1 volt and the tachometer voltage is about 100 V at the higher rolling speeds, it will be understood that the speed regulation is very exact, but in addition to this, there are variations in rolling conditions on account of roll wear, changes in temperature etc. that would make it necessary to have one or several men at the control desk constantly watching the position of the loops.

★ ★ ★

Now, this fine adjustment of the rolling speed is carried out with the aid of loop rheostats. These influence regulation by introducing a voltage into the control circuit (Fig. 7) of the regulator which can be either positive or negative in relation to the voltage set on the potentiometer.

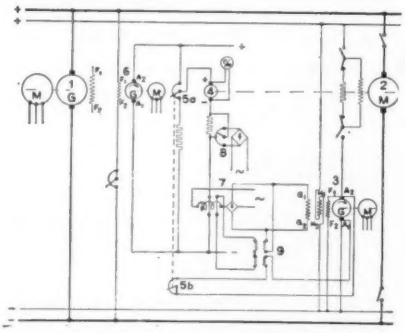


Fig. 7—Speed regulation of main motors uses transductor regulators.

Thus, if the loop between two alternating two-high stands should for any reason begin, for example, to increase the loop rheostat introduces a voltage into the control circuit which acts in the same way as would a falling tachometer voltage. The regulator ensures a suitable reduction in the motor field current, the speed increases and the loop returns to, practically speaking, the same position as before. The advantages of loop lengths which are, as far as possible, constant have been dealt with above. If the first pairs for heavy sections and low speed are disregarded, and also the last alternating two-high pair which is driven by two motors, it can be said that every other loop is kept constant with the aid of exact mechanical calibration of the pair of rolls, and the rest by means of electric loop regulations. In the former case, when calibrating, it is imperative to disregard, to some extent, the demands for tolerances, but in the latter case it is, on the other hand, possible to set the pressure, bearing in mind only the tolerances of the wire. Thus, in ad-

(*Please turn to page* 1056)

Die Refinishing With Boron Carbide Abrasive

by E. Leslie Anderson
Sales Engineer, Abrasive Grain
Norton Company
Worcester, Massachusetts

The heart of any wire drawing operation is the die. Its finish, precision of dimensions and material all have a bearing on the quantity and economical production of wire of every description. The two materials which have proved most satisfactory for wire drawing dies are cemented carbides and diamond.

★ ★ ★

Because of the extreme hardness of these two materials, economical resizing and refinishing of dies is a matter of great importance to wire makers. Diamond abrasive compounds are universally used to produce a high polish on carbide dies and of course it is the only agent which will cut diamond dies. However, in the ripping and semi-finishing of cemented carbide dies, many plants are using the much less expensive boron carbide abrasive. Except for the diamond, this is the hardest commercially available abrasive.

★ ★ ★

Boron carbide abrasive can be used with conventional die working equipment. Although it does not cut as rapidly as diamond abrasive, it can be used more profusely because of the great differential in cost.

Boron carbide, manufactured by the author's company, goes under the trade name "Norbide." Mr. Anderson has described the properties of this abrasive and the proper methods of its use in the ripping and resizing of sintered carbide wire drawing dies. The material was secured by him from the Johnson Steel and Wire Company in Worcester and the illustrations show views in their die room and are shown through their courtesy.

Fig. 1—Attaching a die to a holder preparatory to refinishing with boron carbide abrasive.

★ ★ ★

The abrasive is mixed with a suitable medium to form a lapping compound. It can be applied with a brush or a stick. While each user seems to have his favorite formula for mixing the compound, several oils have been successful. Olive oil, kerosene or mineral oil diluted with kerosene are often used as a vehicle to keep the abrasive in suspension. A half and half mixture of cocoanut oil and cottonseed oil has also been used successfully. Also a super-soluble cutting oil with a mixture of 2 parts oil, 1 part water, and 1 part boron carbide.

★ ★ ★

For ripping dies, sizes 220 and 240 are generally recommended. Size 320F is a popular size for semi-finishing. The finer sizes, 400, 500 and 600 mesh are used for the final finish. The abrasive leaves a characteristic dull gray finish on the die. For drawing operations where the resultant finish on the wire is not as important as size reduction, the die can be suitably finished using only the boron carbide abrasive.

★ ★ ★

If the surface finish on the wire

(*Continued on page* 1052)

Fig. 2—Refinishing worn dies with boron carbide abrasive using conventional die working equipment.

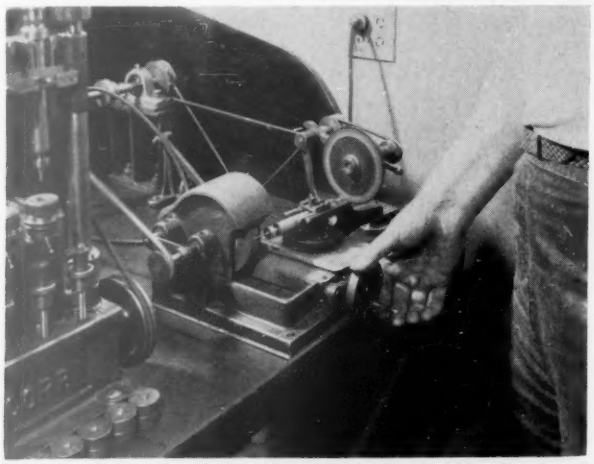


Fig. 3—Regrinding the point of the needle used in refinishing dies.

Production of Round Film Insulated Wires

by Carlisle V. Burns, P.E.
Wire Mill Advanced Manufacturing Engineer
Small AC Motor and Generator Department
General Electric Company
Schenectady, New York

This nomogram was designed primarily as an aid in production scheduling of orders and related activities, where extreme accuracy is not required. It has also found use in estimating manufacturing capacities of film coating and wire drawing facilities.

★ ★ ★

In cases where the operating wire speeds are beyond the range of the Wire Speed Scale (Scale 2), it is possible to extend this range by the simple expedient of mentally multiplying both the speed scale and the Wire Production Scale (Scale 3) by a factor of ten. Thus, in the example shown, assume 10 mil. copper wire running at 79 fpm yields production (or consumption) at a rate of 1.5 lb./hour. If this wire size runs at 7.9, 790, or 7900 feet per minute, however, the usage is approximately 0.15, 15, or 150 lb./hour, respectively.

★ ★ ★

These scales represent a solution to the equation $P = K^1 D^2 S$,

where P = wire production, lb/hr,
D = BARE wire diameter, mils,
S = wire speed, fpm, and
K^1_{cu} = a constant = 184.3, or
K^1_{Al} = 57.1

★ ★ ★

The constant K^1 was empirically determined from single Formex film builds; it is not theoretically correct for each wire size shown. The maximum theoretical error thus introduced has been calculated to be less than 0.9 of 1%.

This nomogram is the second prepared for this publication by Mr. Burns, being designed as an aid to production scheduling and being useful in estimating capacities of equipment for film coating and drawing.

★ ★ ★

A nomograph similar to this may also be constructed for bare wires. The equation for such a chart is identical except for the value of the constant, K.

★ ★ ★

For bare wire $K^1 = 720\ P \frac{\pi}{4}$

where P = sp. wgt. of metal
= 0.321 lb/cu. in., copper, or
= 0.0976 lb/cu. in., aluminum, and
K^1_{cu} = 181.5

★ ★ ★

The theoretical error to be expected if this chart is used for bare wires is then

$$\frac{184.3 - 181.5}{181.5} \times 100$$

$$= \frac{280}{181.5}$$

$$= 1.54\%$$

This error, caused by using the chart for purposes other than the design purpose, will always be positive. That is, the answers will be higher than actual values. In a similar manner, it may be shown that this chart is applicable to heavy Formex film builds with errors of less than 1.8%.

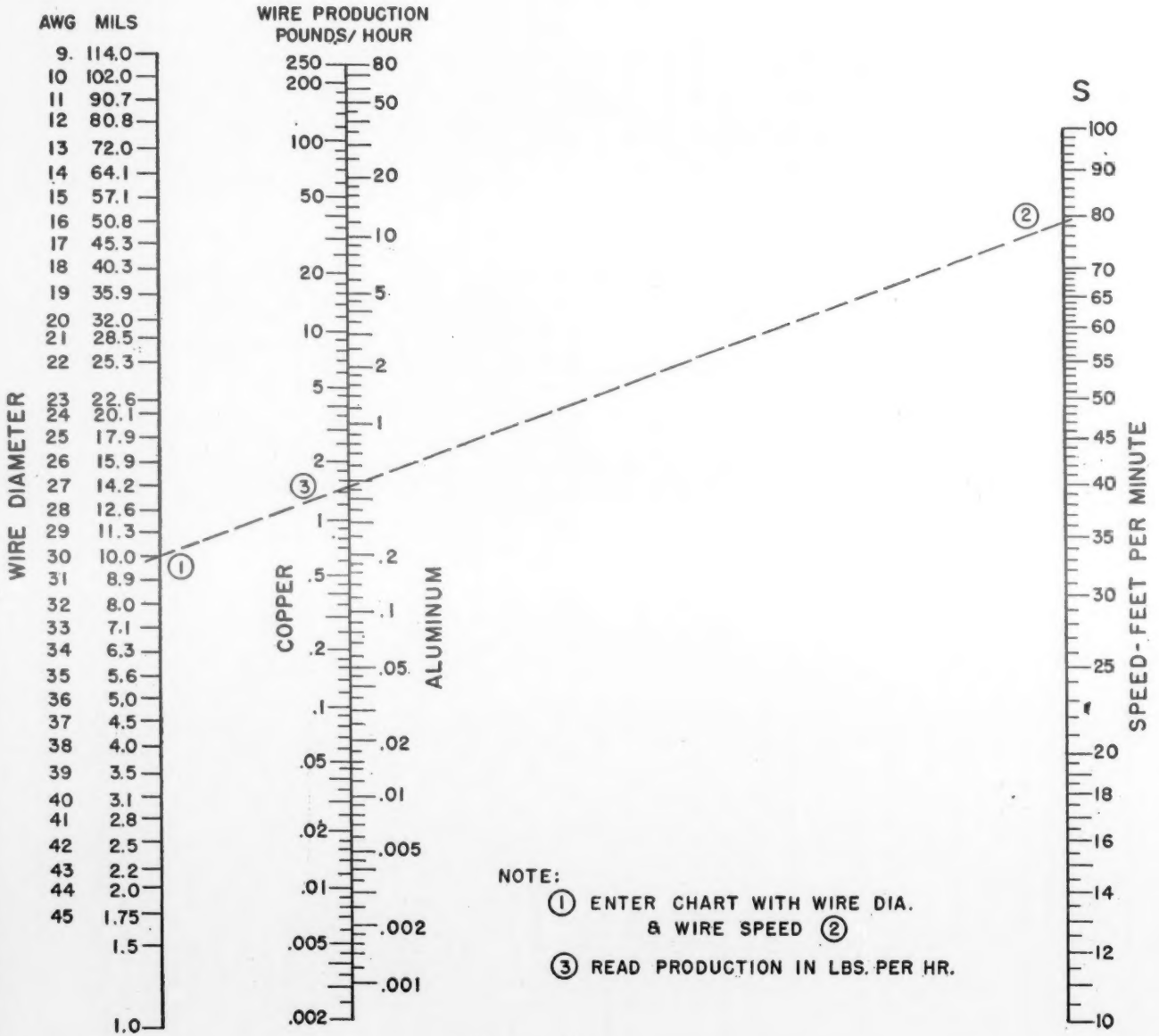
★ ★ ★

Note, however, that approximately 3% error may be introduced by inability to read Scale 3 closer than 2 significant figures. This error may be either positive or negative. In view of this error and the mechanical inaccuracies inherent in the construction, reproduction and use of the nomograph, it is estimated that errors as large as 5% may be encountered. Such results are to be expected in nomographs as well as with other types of graphical computation.

The NOMOGRAM appears on the following page.

PRODUCTION OF ROUND FILM INSULATED WIRES

WIRE MILL MANUFACTURING



NOTE:

① ENTER CHART WITH WIRE DIA. & WIRE SPEED ②

③ READ PRODUCTION IN LBS. PER HR.

$P = K'D^2S$

WHERE K' = AN EMPIRICAL CONSTANT

$K'_{Cu} = 184.3$

$K'_{Al} = 57.1$

D = WIRE DIAMETER, INCHES

S = WIRE SPEED, FPM

TO USE THIS CHART AT OTHER SPEEDS SIMPLY MULTIPLY VALUES ON SCALES ② & ③ BY A MULTIPLE OF 10.

EXAMPLE: IF 10 MIL WIRE RUNS AT 7.9 FPM $\left(79 \times \frac{1}{10}\right)$, THEN PRODUCTION OF COPPER WIRE WILL BE 0.15 LB PER HOUR $\left(1.5 \times \frac{1}{10}\right)$.

C. BURNS
5-23-56

Thermal Embrittlement Of the More Crystalline Polyethylenes

by

R. H. Carey
Group Leader

J. A. Snyder
Group Leader

H. C. Vakos
Development Engineer

Bakelite Company
a Division of
Union Carbide Corporation
New York, New York

This paper treats of the time-dependent tests accumulated on the new polyethylenes of the more crystalline types when they are under stress for extended periods of time at elevated temperatures.

At a meeting last winter, the static properties of the more crystalline, low-pressure-type polyethylenes were discussed. It was noted that the new polyethylenes possess the same general advantages as the older, more familiar polyethylenes, namely; chemical resistance, low temperature flexibility, moisture resistance, and low electrical losses. In addition, the more crystalline resins appeared to possess many short-time mechanical property advantages, such as deformation resistance, softening temperature and abrasion resistance. These advantages still hold true. However, by their very nature, the static tests could not tell the story of long-time service. In a structural use such as wire and cable insulation and jacketing, changes in properties with time are important. In this paper, the results of time-dependent tests accumulated during the past year will be discussed. It is believed that the information presented will aid in the proper evaluation of these polymers in applications where long-time stability is of the essence.

★ ★ ★

In wire and cable applications, some part of the polyethylene is in a state of stress; that is, some part of the cable or wire is always under tension or compression due to external loading. Thus, any resin used on wires and in cable must be capable of sustaining reasonable stresses for extended periods of time. Another consideration is that in most applications exposure to relatively low elevated temperatures on the order of 60 deg. C. are common. Therefore, it is appropriate to study the more crystalline polyethylenes when under stress for extended periods of time at similar elevated temperatures.

★ ★ ★

The basic methods of failure, creep and rupture, were studied, using dead weight loading of standard tensile bars.

★ ★ ★

The first observations obtained from the less crystalline polymers were as expected:—the amount of creep obtained over a specific length of time was primarily dependent upon temperature and crystallinity, or density. Figure I shows the effect of temperature.

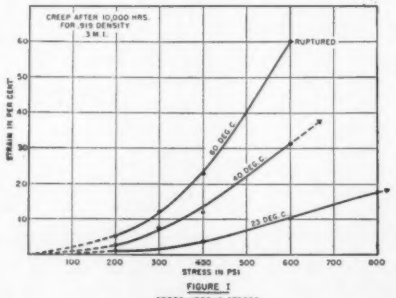


FIGURE I
CREEP VERSUS STRESS

Figure II shows the amount of creep after thirty days at 60 deg. C. and 600 psi for resins with various melt indices in the .910 to .930 density range. These graphs indicate that creep is not only dependent upon crystallinity, or density, but also upon molecular weight (or melt index). For example, resin of melt index 0.8 creeps less than resin of similar crystallinity and melt index of 1.4. The higher the molecular weight (lower melt index), the less the creep or elongation.

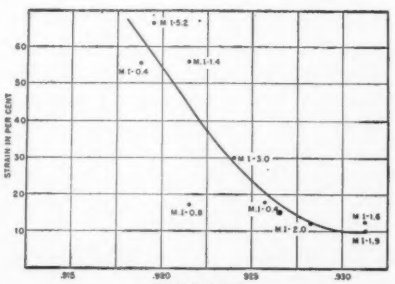


FIGURE II
CREEP OF POLYETHYLENE VS. DENSITY

Figure III presents an extension of the data found in Figure II. Creep after approximately one year (10,000 hours) for different tensile loads at 60 deg. C. is plotted for resins of various densities and melt indices. It is seen that both an increased density and a decreased melt index reduces creep. Also, a lower melt index at a certain density level permits a greater amount of creep before rupture. Further, it is evident that an increased density may reduce creep

under a certain loading, but appears to have little effect upon the minimum stress to rupture. Apparently, creep is mainly dependent upon crystallinity or density, while rupture is primarily dependent upon molecular weight or melt index.

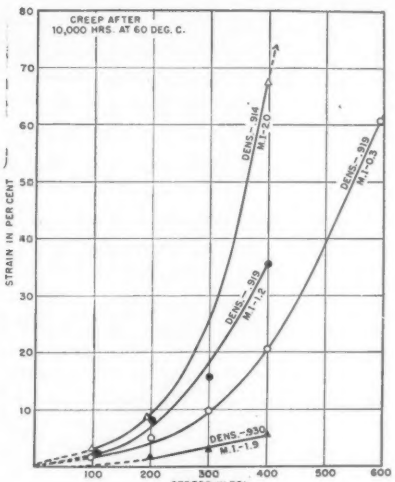


FIGURE III
CREEP VERSUS STRESS

With these data as a background, similar tests were run on the very high density, highly crystalline, polyethylenes. A water bath was used only to control temperature. Spot checks in air showed the test results in water were equivalent to those obtained in air. It was concluded, therefore, that the water plays no important part in determining the life of these polyethylenes.

★ ★ ★

Stress-time curves for the highly crystalline materials are shown in Figure IV. At times less than about 100 hours for a resin with a melt index of approximately one, failure occurs by elongation, or creep, to the limit of the machine (20 per cent). In other words, a "ductile" failure occurs. At times greater than 100 hours (approximately), failure occurs by fracture, or rupture, with little or no elongation. The point of abrupt change in slope in these curves is called the "induction" point. At times less than this "induction" point, failure occurs by creep. At times greater than this point, failure occurs by rupture and the curve falls off at a rapid rate, approaching, in general, the magnitude of structural stress which may be imposed upon the less crystalline polyethylenes at the .92 density level.

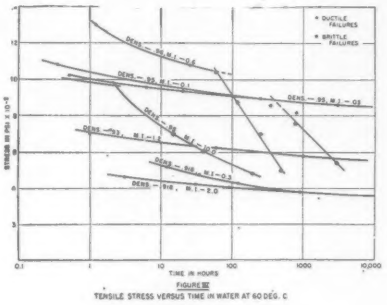


FIGURE IV
TENSILE STRESS VERSUS TIME IN WATER AT 60 DEG. C

Using the "induction" period as a basis for comparison, it is noted, as shown in Figure V, that highly crystalline resins of lower melt index have the longer "induction" periods. At a melt index of approximately 0.1, the "induction" period is 1,000 hours, while at a melt index of 20 the "induction" period is approximately 2 hours. These data imply, then, that to realize on a long-time basis the strength advantages indicated by the short-time tests, resins with melt indices of the order of 0.2 and lower may be required.

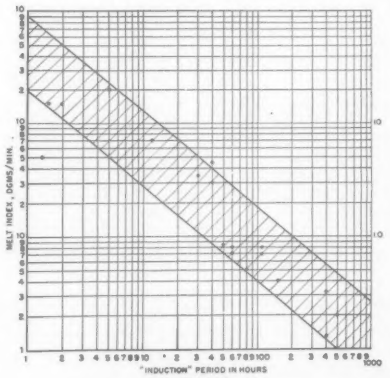
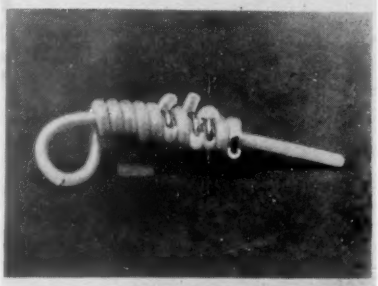


FIGURE V
INDUCTION PERIOD VS. MELT INDEX .945 TO .960 DENSITY POLYETHYLENE

It is difficult to apply directly the basic information discussed so far to wire insulation and jacketing where a relatively complicated system of stresses can exist. Therefore, a practical test using insulated wire was employed. The familiar "heat shock" sample was prepared by wrapping an insulated wire around its own diameter approximately ten turns. This sample was then aged at 70 deg. C. until the insulation under stress fractured, as illustrated by Figure VI.

FIGURE VI — INSULATION EMBRITTLEMENT

AGED 24 HOURS AT 70 DEG. C.



RESIN DENSITY—0.95
RESIN MELT INDEX—0.7
No Antioxidant

It must be emphasized at this point that only the portion of the insulation under stress (strain) embrittles or fractures. The straight portion of the sample remains whole and as flexible as it was prior to aging when measured by hand tests. In contrast, the stressed sections snap and break in two when flexed. Thus, it is quite clear that without the stress (or strain in this particular case) no degradation of mechanical properties occurs. Also, the elevated temperature is a prerequisite for fracture. Heat shock samples, aged similar periods of time at room temperature, remain flexible throughout their lengths.

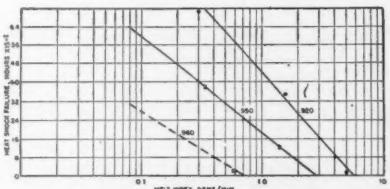


FIGURE VII
INSULATION THERMAL EMBRITTLEMENT
TIME TO FAIL AT 70 DEG C VERSUS MELT INDEX

Figure VII presents time to rupture versus melt index for polyethylenes of various crystallinities. The .92 density polyethylenes of today have performed and continue to perform admirably with respect to this embrittlement property. Nevertheless, as illustrated, they too will embrittle under sufficiently severe testing. Therefore, it is reasonable to use their performance curve as the criteria of practicality. It is seen from these data that for a .95 density resin to equal the .92 density resin of 1 to 2 melt index resin in thermal stress rupture (or embrittlement) performance as measured by the "heat

shock" test, a melt index range of .25 to .70 is required. For a .960 density resin, a .03 to .12 melt index is required.

★ ★ ★

The exact mechanism involved in the insulation embrittlement phenomenon is not known. However, it is quite apparent, from the results presented so far, that it is not only dependent upon crystallinity, but also on melt index or factors, such as molecular weight, which affect melt index. Molecular weight measurements support this indication. At a particular melt index level, the molecular weight of the highly crystalline polyethylenes of 0.95 to 0.96 density is between one quarter to one half that of the less crystalline resins of a 0.92 density. For example, as shown in Table I, at a 0.6 melt index level, the weight average molecular weight of a typical 0.95 density polyethylene is of the order of 200,000 compared to 800,000 for a commercial 0.92 density resin. Number average molecular weights give a similar comparison of 6,000 versus 25,000 approximately for 0.95 and 0.92 density polyethylenes, respectively. Thus, if molecular weight should prove to be the prime factor in determining the thermal embrittlement of insulation, then, lower melt index resins must be used as density rises, if time to rupture under stress (or strain) is to remain at a constant practical level.

TABLE 1—MOLECULAR WEIGHTS OF POLYETHYLENES

Density	.95	.92
Melt Index	0.6	0.6
Weight Average Molecular Weight	200,000	800,000
Number Average Molecular Weight	6,000	25,000

★ ★ ★

Other factors which could affect the stress rupture properties or thermal embrittlement of polyethylenes have been and are being investigated. For example, oxidation of polyethylene occurs at relatively low temperatures—at very slow rates, to be sure, but it still occurs. The effect of oxidation was evaluated by using a practical test of measuring the "heat shock" time to failure for insulation produced from virgin resin as compared to the time to failure of insulation containing antioxidant. The addition of .05 weight per cent of antioxidant increased the time to failure at 70 deg. C. of a 0.2 melt index .95 density polyethylene from less than one day to more than one hundred days. In apparent contradiction to these results, there was no significant effect of antioxidant on the time to rupture during the stress-rupture test where dead weight loading was employed. A possible explanation exists in the difference in strain achieved in the stress-rupture and "heat shock" tests. Strains of less than ten per cent at rupture are reached in the stress-rupture test, whereas a constant maximum strain of fifty per cent exists in the "heat shock" insulation samples.

★ ★ ★

More basic studies on the effect of type and amount of antioxidant are in progress, so that commercial compounds based on highly crystalline polyethylenes will have optimum thermal stability.

FIGURE VIII a—ELECTRON MICROGRAPHS OF POLYETHYLENE SPHERULITES

Etched Surfaces
Magnification: 10,000 ×

.95 Density

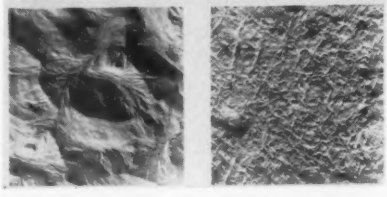
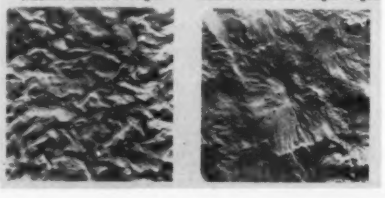


FIGURE VIII b—ELECTRON MICROGRAPHS OF POLYETHYLENE SPHERULITES

Etched Surfaces
Magnification: 10,000 ×

.92 Density



Another aspect of these studies is concerned with the evaluation of insulation extrusion conditions on the time to failure or rupture of "heat-shock" samples. Compound temperatures and drawdown, the primary suspects, were checked over what was believed to be practical ranges consistent with current practice. No practical effects were noted over a compound temperature range of 180 deg. C. to 250 deg. C. and a drawdown range of seventy per cent. (To cover the drawdown range, dies giving thirty-five per cent above and below the desired cross-sectional area were employed.) It would appear that insulation embrittlement is inherent in the resin and not in the technique of insulation fabrication.

★ ★ ★

Crystalline structure and its stability at elevated temperatures is another factor under study which theoretically could affect embrittlement under stress. The difference in spherulitic structure between the high and low density polyethylenes is marked and is affected by both heat aging and molecular weight as illustrated in Figure VIII. These studies are in progress and, along with the other studies mentioned, will lead to a better understanding of the thermal embrittlement mechanism of strained polyethylene insulation.

★ ★ ★

In summary, then, it has been found that although creep may be nil, the highly crystalline polyethylenes do embrittle under stress (or strain) at elevated temperatures. The mechanisms involved have not yet been completely described. Nevertheless, by the proper selection of molecular weight, and the incorporation of an antioxidant, thermal embrittlement characteristics approaching those of the lower density polyethylenes found so reliable in wire and cable applications can be achieved.

★ ★ ★

It is believed that the foregoing information will enable a more rapid and objective evaluation of the high density polyethylenes in structural applications by restricting studies to resins of the proper melt index ranges. In this manner the new crystalline polyethylenes will more rapidly find their proper role in industry and earn the same degree of confidence enjoyed by the less crystalline polyethylenes employed so widely today.

NEWS OF INTEREST TO THE WIRE AND CABLE INDUSTRY VOL. II No. 4

WIRE Recorder

T.M. REG. U.S. PAT. OFF. MONSANTO CHEMICAL CO.

PUBLISHED BY MONSANTO CHEMICAL CO., PLASTICS DIVISION, SPRINGFIELD, MASS.

Monsanto "House of the Future" Attracts Nationwide Interest

"The world's first plastic house" which was unveiled by Monsanto recently at Disneyland in California has become one of the top news stories of the year since its introduction. Virtually every major news and picture magazine on the commercial market carried stories and photographs covering every phase of its forward-looking design and construction.

Of particular interest to the wiring industry is the unique system of wiring which services the appliances used in the house itself. Operating through a system of pre-cast wire conduits within the walls and floors, the electrical system has modular bents for each of the five rooms of the house, which plug into a central power core.

Among the many push-button appliances on display within the house are the "Atoms for Living Kitchen" by Kelvinator with three refrigerators molded into the walls, each having varying degrees of cold for the storage of different types of food. A movable electric range that may be lowered electrically when not in use is also part of the kitchen equipment. A telephone system with phones having pre-set and push-button dialing, hands-free speakers and transmitters was developed by the Bell Telephone System. Bathrooms with miniature recessed clothes dryers and push-button dispensers for shampoos, shaving lotions, dentifrice, etc., were designed by the Crane Co.

Television is another important feature of the "House of the Future," with TV enabling the person within the house to see whomever is at the door when a doorbell rings, as well as permitting one to see the person on the other end of a telephone conversation. There are also TV sets designed for both parents and children as part of the standard equipment.

The Monsanto "House of the Future" was designed and built by the Plastics Division of Monsanto Chemical Company in cooperation with Hamilton & Goody architects and the Massachusetts Institute of Technology. Twelve of the country's top manufacturers developed special furnishings and equipment for the house.

Wide Range of Lighting Combinations Tested in Lighting Proving Ground

A new demonstration roadway lighting laboratory has been constructed by General Electric at their Hendersonville, North Carolina, plant. More than 30 individual street lighting designs are installed at the outdoor lighting center where they may be tested for effectiveness in improving street and highway lighting equipment.

The streets of the lighting center, less than one-third of a mile in length, provide the opportunity for demonstrating the effects of a wide range of lighting techniques currently available for American highways. Virtually all types of street lighting equipment are given practical demonstrations on various types of pavement and on all major street classifications. The various lighting demonstrations are available to municipal officials, state highway representatives, utility lighting engineers, and other users of street lighting equipment.

GE plans to conduct extensive studies, investigations and research at the light "proving ground" to determine how well drivers are actually able to see under various roadway lighting systems. The area will also serve as a testing laboratory in developing improved equipment to help reduce night hazards to both drivers and pedestrians.

Lighting changes can be accomplished in a short space of time through the use of a master control panel. This enables viewers to compare the effects of incandescent, mercury and fluorescent lighting on streets similar to those found in the average community. Comparisons of new and

(Continued on Page 4)

MONSANTO WIRE RECORDER
newsletter
Monsanto

$15,000 BUYS COMPLETE TV STUDIO FOR SMALL TOWNS - A television studio, which could bring live TV to hundreds of small communities at approximately one-tenth the cost of conventional studio equipment, has been developed by the Siegler Corporation of Anaheim, California. Complete, except for a transmitter, the studio could be operated by one man using a master-control console, which would combine all audio and video control equipment normally contained in several separate units.

RADAR GIVES WARNING OF FLASH FLOODS - A new warning system that would forecast flash flood conditions to low-lying areas while the rain is still falling in headwater regions has been proposed to the American Meteorological Society. By having the advance knowledge of exact location and quantity of rainfall in these remote areas, level of rising rivers could be forecast several hours in advance of actual flood conditions.

CONSTRUCTION WORKERS TAKE TO TV IN MID-MANHATTAN - Broadway and Hollywood stars are taking a back seat these days to a crew of electricians, carpenters and other construction workers engaged in building a modern, aluminum-clad office building on Manhattan's East Side. The building firm in charge has installed a closed-circuit TV camera which transmits scenes of workmen in action completing the actual construction of the building. Three 21-inch receivers located at the street level bring close-ups of the operation to "sidewalk superintendents."

MANUFACTURERS AND UTILITIES CO-OPERATE TO SOLVE COMMON PROBLEMS - The growing atmosphere of friendliness and co-operation existing between equipment manufacturers and their utility customers was given visible proof recently in Pennsylvania, when representatives of four manufacturers and utility companies met in an open symposium to discuss and resolve mutual problems. This is a practice winning wide acceptance in many parts of the country.

TWO-WAY RADIO COMMUNICATION IN PLANT SAVES THOUSANDS IN OPERATING COSTS - Installation of industrial, two-way radios on fourteen material-handling trucks at East Coast aircraft company has reduced operating costs by more than $1,700 per truck. Use of the radios has reduced to a minimum problems of fluctuations in the work load in various areas as well as the difficulty of a widespread acreage covering plants, storage, railroad sidings, airfield and parking lots.

PAY-AS-YOU-SEE TV LOOMING ON HORIZON - Closed-circuit systems are being considered on both East and West Coasts. The Metropolitan Life Insurance Company has indicated its interest in entering the field of "pay-as-you-see" television by reviewing plans to install the toll TV in its nearly 35,000 apartments located in seven U. S. cities. The operation would be transmitted by means of cables instead of being broadcast through the air. By being operated as a "project" of the insurance firm, the system would not require FCC approval.

Top Performance of Opalon® 71344 Requires Proper Production Techniques

The use of a heated water bath and heated conductor when running Opalon® 71344 proves to be of great benefit in retaining initial strength of compound. Any material which is required to retain a high proportion of its original tensile properties after severe aging must be extruded in such a manner to develop the optimum properties of the compound. Opalon® 71344 has been specifically designed for the exacting specifications required by the aircraft industry and the military establishment. Even though these compounds are based on raw materials carefully selected to meet these requirements, preheating of the conductor, a hot water bath, and proper extrusion temperature are necessary for these materials to consistently pass the specified tests.

The reason for these stringent requirements is that in aircraft applications the thinnest possible wall thickness is used for wire insulation in order to aid in conserving total weight. With a thin wall construction it is particularly important to have a homogeneous insulation with no flaws or imperfections. The best manner of showing up such flaws is in tensile testing after accelerated aging. Consequently, the specifications require high retention of physical properties to indicate that the optimum processing conditions were used in making the final construction. Thus, great care must be used by the wire manufacturers to develop these properties so that the finished construction will give long service life without failure.

Since Opalon® 71344 is of a semi-rigid nature, it is processed at extremely high (for vinyls) temperatures. Thus, when the hot stock touches a cold conductor, it is severely chilled causing invisible cracks and other flaws on the inner surface of the insulation. If the conductor then passes through a cold water bath, the outside is also chilled giving small flaws on the outer surface unseen to the naked eye. Since the wall thickness is very thin, this leaves a very small section of insulation remaining which can cool slowly allowing internal strains present to relax. Opalon® 71344 extruded under these unfavorable conditions will not only show low initial elongations but variable retention of elongation after aging which would indicate that its trouble-free service life may be quite short.

By heating the conductor to the range of 300-350°F, the differential between the vinyl stock temperature and the conductor temperature is narrowed considerably, minimizing the strains set up in the insulation and allowing the internal surface of the stock to slowly cool with no flaws. A similar effect on the external surface is obtained by using a hot water bath which is placed a good distance from the die of the extruder. After the construction leaves the crosshead, the plastic slowly begins to cool in the air and by the time it reaches the cooling bath, it is subjected to a considerably lessened shock, minimizing the flaws caused by strain. In this manner, there is a fairly heavy section of insulation which is free of strain. Thus, by preheating the conductor and using a hot water bath, the optimum strength properties of the vinyl insulation are developed, giving high initial tensile properties and high retention of tensile properties after oven aging tests.

The Big Cities Come Back

A resurge of interest in America's Main Street is reversing the "move-to-the-suburbs" trend which followed World War II. Cities, large and small, across the nation are bulldozing their way upward and outward from the slums and traffic-stifled confines of recent years. Super highways, spacious downtown parking garages, modern stores, offices, apartments and hotels have brought about a switch in major construction from rural housing developments and small shopping centers to a new era of high pressure commercial construction.

Office buildings in downtown areas are being constructed in numbers unequaled since the twenties, with some equaled since the twenties. Also giving the big towns a "new look" are residential dwellings, with large apartment houses rising in areas which were formerly slums. Wide, sweeping expressways cut across the busiest sections of the cities bringing business swiftly into the heart of town in minutes.

Pittsburgh, one of the first of the big cities to recognize the need for drastic steps, has transformed its famed "Golden Triangle" into a park-like area with new modern buildings and greenery that can really grow now that much of the city's smog has been eliminated. Seattle is bursting with pride over a new civic center which it has on schedule, and Chicago is in the process of raising more than 100 million dollars for a slum clearance project extraordinary, that would halt the spread of slums around the University of Chicago.

In Boston, a new throughway is rolling across the center of the city, and the Prudential Insurance Company has promised a new building project for the Back Bay that will rival New York's Rockefeller Center! In New York itself, expressways,

(Continued on Page 4)

Manufacturers Meet to Standardize and Improve Wire and Cable

Wire and cable manufacturers of the National Electrical Manufacturers' Association meet three times each year, with individual committees meeting more frequently, to find methods of improving and standardizing equipment, and for the origination and advancement of load-building and adequate wiring programs. Both outside and allied organizations, the Federal Government and the Edison Electric Institute cooperate in projects.

Among the many areas covered by the manufacturers in these meetings are such subjects as reporting on new types of wire insulation, safety regulations, atomic power, and the effect it may have on the wire and cable industry, as well as future uses of wire and cable products.

Other phases covered by the group include the drafting of a proposed standardized accounting method for reels and spools, and a study of the overall NEMA financial and operating ratio survey. They also review and discuss the current problems and developments of the complete wire and cable field, consider operations in the area of traffic control within the industry, which includes existing rate structures of common carriers. Another group is concerned with the development of standards affecting the technical capabilities of various types of wire and cable.

The activities of this group have proved to be of great help to manufacturers in appraising their own operations on a permanently continuing basis, enabling them to better serve their customers.

Polyethylene 11302 Gives Superior Weatherability . . . Competitive Extrusion

Polyethylene compounds designed for line wire and service drop wire applications must be able to withstand many years of exposure to sunlight and general outdoor weathering without degrading. Insuring proper resistance to ultra-violet light degradation means thoroughly dispersing a suitable amount of small particle-size channel carbon black in the polyethylene.

The 6th draft of the ASA Specification for Weather-Resistant Wire and Cable requires that compounds contain 3.0 ± 0.5 per cent by weight of medium-color channel black having a maximum particle size of 20 millimicrons and have a minimum light absorptivity of 24,000. It is interesting to note that it appears to be possible for compound containing non-specification grades of carbon black to meet this light absorption requirement. Since, at the present time, no valid correlation has been established between light absorptivity and weatherability, use of polyethylene compounds containing the necessary amount of the proper black, well dispersed, is the only positive step wire manufacturers can take to assure maximum quality in their line and drop wire.

Figures 1 and 2 illustrate the difference in weathering characteristics which may be expected from two different carbon blacks. Both figures are photomicrographs (enlarged 100 times) of the surfaces of polyethylene compounds exposed in a weatherometer for approximately 5,000 hours. Figure 1 shows the degradation of a compound containing 2% of a channel-type carbon black having a particle size of less than 20 millimicrons. Figure 2 illustrates the degradation of a polyethylene containing 2% of a furnace-type carbon black with a particle size of approximately 30 millimicrons. It can be seen that after this severe exposure test the surface of the small particle-size channel black sample is only slightly crazed, while severe degradation of the compound containing larger-size furnace black has occurred as evidenced by the development of large, deep surface cracks.

Monsanto's polyethylene compound 11302 has been designed for line wire and service drop wire applications. To assure superior weatherability, 11302 contains more than 2.5% of channel-type carbon black having a particle size less than 20 millimicrons. Upon request, Monsanto will certify that 11302 meets *all* of the requirements of the 6th draft of the American Standards Specification for Weather-Resistant Wire and Cable. In addition to its superior weatherability, which property should appeal to customers of wire and cable manufacturers, 11302 has been proven through extensive production experience to extrude at competitive rates with excellent surface appearance. 11302 insulations readily meet the original and aged physical property requirements of applicable line and drop wire specifications.

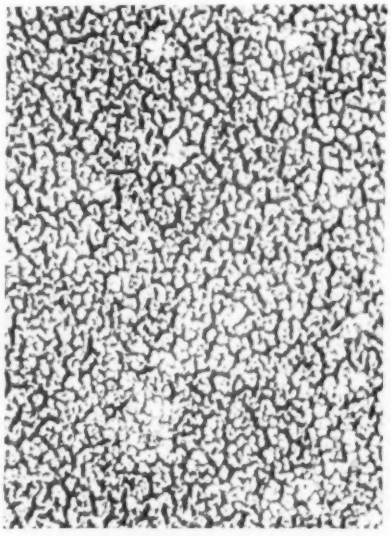


FIG. 1

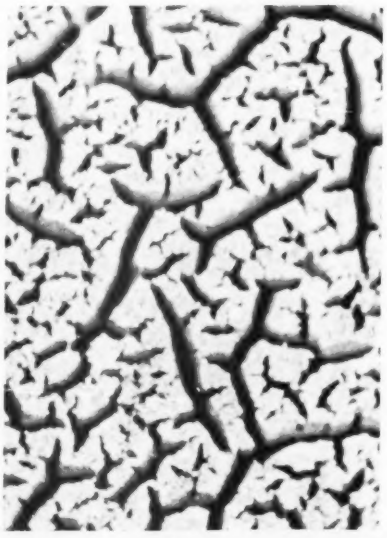


FIG. 2

Monsanto

MONSANTO CHEMICAL COMPANY
PLASTICS DIVISION—SPRINGFIELD, MASSACHUSETTS

Lighting Combinations

(Continued from Page 1)

old style lighting fixtures and designs are also made at the testing area.

Among the newer styles of street lighting being tested at the center are a method of fluorescent street lighting, arranged parallel to the roadway, and a second "T lighting" arrangement which utilizes a form of parallel lighting in addition to a normally mounted Form 406S unit. GE has made the testing area available to state, municipal, and electrical utility officials to help them sell the idea of adequate lighting to their individual publics, city councils or any other interested parties.

Big Cities

(Continued from Page 3)

tunnels, bridges and other major projects started since the end of World War II, are responsible for an overall outlay approaching the 5 billion dollar figure.

Philadelphia is still another city with a new outlook. A 22 acre civic center is replacing the old Broad Street railroad station with new office buildings, modern hotels and an ultramodern city bus terminal. In another section of town, historic Independence Hall is receiving the glamour treatment with wide malls filled with trees and gardens, replacing the once congested area which surrounded the famed landmark. A total of eight slum-clearance projects are also underway, and in still another part of town, thousands of acres have been set aside for industrial development.

Nylon in Wire and Cable

by A. L. Gibson
Polychemicals Department
E. I. du Pont de Nemours and Company, Inc.
Wilmington, Delaware

We propose a vote of gratitude to the Signal Corps for the development of WD-1 Infantry Field Wire. They added a fine new tool to the arsenal. They also gave a dramatic demonstration of the remarkable toughness and durability of nylon as a wire jacket.

★ ★ ★

Now we find nylon moving into a wide variety of other military and civilian uses. Its toughness, abrasion resistance, wide temperature range and chemical resistance are solving a host of serious service problems. We will describe here a few of these applications and present data on the properties of the family of "Zytel" nylon resins. With wider knowledge of the properties, cable designers will be able to exploit "Zytel" further, solving field problems and reducing costs.

★ ★ ★

First let us examine some of the uses for "Zytel" in wire and cable now established commercially and growing. (See Table I).

TABLE 1

Infantry Field Wire (WD-1)
Radio and TV Hook-Up Wire
Switchboard Wire
Equipment Hook-Up Wire (Mil-W-16878 B (Navy))
Hook-Up Wire (MIL-W-76A (Armed Forces))
Aircraft Wire (MIL-W-5274 A (USAF))
Aircraft Wire (MIL-W-5086 (Navy, USAF))
Control Cable
Appliance Wire
Thermocouple Wire
Magnet Wire
Tree Wire
Navy Tow Cable (MIL-C-15452-B)
Navy "TTRS" Cable
Radiant Heating Wire
Gas Station Wire
Electric Blanket Wire
Blasting Cap Wire

This paper was presented at the Signal Corps' Fifth Annual Wire and Cable Symposium at Asbury Park, N. J., on December 4, 1956.

Textile Braid Coverings
Refrigerator Defroster Wire
Geophysical Cable
Wire Rope
Power Cable Jackets
Telephone Cable Jackets
Spiral 4 Cable
Building Wire
Automotive Ignition Wire

★ ★ ★

Now let us examine in some detail the properties of "Zytel". In this discussion we refer to various types of "Zytel" by code number. These are defined further along in Table IV.

Mechanical Properties

Deformation Resistance: A most outstanding property of "Zytel" nylon involves its exceptional resistance to deformation even at elevated temperatures.

★ ★ ★

"Zytel" 33, the most widely used by the wire and cable industry, raises the service temperature of vinyl or polyethylene insulated wire by inhibiting the deformation of the primary insulation.

★ ★ ★

The test results shown in Table II illustrate this property quite graphically.

TABLE II

Test Method - Randall Stickney
Load - 1000 gms.
Time & Temp. - 1 hr. @ 100°C

Tree Wire			
1) 4-7 Aluminum	50 mils polyethylene	7 mils "Zytel" 33X	
Deformation:	Polyethylene	75%	
	Polyethylene & "Zytel"	19%	
Control Cable Conductor			
2) .071 Copper Strand	17 mils polyethylene	8 mils "Zytel" 33	
Deformation:	Polyethylene	100%	
	Polyethylene & "Zytel"	22%	
Control Cable Conductor			
3) .115 Copper Strand	27 mils PVC	5 mils "Zytel" 33	
Deformation:	PVC	49%	
	PVC & "Zytel"	23%	

Abrasion Resistance: "Zytel" can be rated as excellent in its resistance to all forms of abrasion. This, of course, is a function of its hardness resilience and low coefficient of friction. An example of this exceptional property can be noted in tree wire. This construction is subject to rigorous abrasion from tree limbs. Table III shows the effects of abrasion on a polyethylene insulated construction with and without a "Zytel" jacket. The results speak for themselves. This construction offers considerable savings on lines where trees are troublesome. The test equipment is a modified GE abrader with a sharp-edged blade as the abrading element. The load on the blade is 1250 grams.

TABLE III

ABRASION TESTS - TREE WIRE

#4 Solid Copper 4/64" "Alathon" 5, BK-22 10 mils "Zytel" 33X

	Cycles to Failure
Polyethylene	12,000 to 14,000
Polyethylene & "Zytel"	46,000 to 50,000

Coefficent of Friction

As mentioned in the previous section, the low coefficient of friction contributes to the excellent abrasion resistance of "Zytel." However, in a multiconductor cable where "Zytel" is used either as a primary or a jacket over the primary, the ability of the conductors to slide easily on one another, enhances the overall flexibility of the finished cable. While "Zytel" is stiff material, it is characteristically used in thin walls and does not seriously impair the flexibility of the insulated strand or cable over which it is used.

★ ★ ★

In the case of a cable which must be pulled through conduit, an outer "Zytel" jacket protects from damage and allows for easier pull-

ing. The static coefficient of "Zytel" is 0.37, the lowest of any jacketing material.

Temperature Range

"Zytel" 33 can be subjected to a temperature of 200°C for a few minutes without softening. It can also be operated at 150°C for several hours without embrittlement. For continuous operations, we recommend a conservative 105°C. Table IV shows data on low temperature flexibility. The tests were performed according to ASTM D 746-55T.

TABLE IV

LOW TEMPERATURE FLEXIBILITY LIMITS

"ZYTEL" 33

At 1.4% Moisture (Equilibrium @ RT and 50% RH)	Dry - 90°C
	- 65°C

"ZYTEL" 37X

At 1.4% Moisture (Equilibrium @ RT and 50% RH)	Dry - 100°C
	- 75°C

Chemical Properties

The resistance of "Zytel" to chemicals and solvents is generally outstanding. "Zytel" 33, 3606, and 37X are the most outstanding, being insoluble in common solvents, alkalies, dilute mineral acids and most organic acids. They are not affected by petroleum oils and greases at temperatures as high as 150°C. "Zytel" is soluble in phenol and formic acid. It is also attacked by other than dilute solutions of mineral acids. Table V lists in four groups, various classifications of chemicals and their reactions, if any, on "Zytel." These listings as shown, cover those chemicals with which (1) "Zytel" may be permanently in contact (no reaction); (2) "Zytel" may be in contact frequently for short periods; (3) "Zytel" may be in contact infrequently for short periods; and (4) "Zytel" may not be in contact due to actual chemical reaction.

Flammability

When exposed directly to an open flame, "Zytel" will burn slowly. In some constructions it is self-extinguishing. Tests were conducted with "Zytel" 33 as a jacket over "Rulan" flame retardant plastic, polyvinyl chloride and a glass braid. These were performed according to the Underwriters' Laboratories vertical flame test requirements, which require five fifteen-second applications of a bunsen flame with fifteen-second pauses. Even after the last application, the flame went out immediately.

TABLE V

CHEMICAL RESISTANCE

(1) No Action

Alcohols (up to 150°F.)	Ketones
Aldehydes (except formaldehyde)	Soaps
Amides (dimethyl formamide)	Neutral salts
Esters	Salts of weak acids and strong bases
Ethers	Dilute solutions of weak acids
Glycols (except HT)	Higher fatty acids
Hydrocarbons (gas, diesel oil, benzine, etc.)	Water
Halogenated hydrocarbons	

(2) Frequent Contact for Short Periods

Strong Alkalies
Most Organic Acids
Formaldehyde
Alcohol 150° to 200°F.
Mercaptans
Amines at elevated temperatures

(3) Infrequent Contact for Short Periods

Salts of weak bases and strong acids in dilute solutions
Dilute mineral acids
Acetic acid
Dilute formic acid
Mild oxidizing agents

(4) No Contact - Will React Chemically

Phenols
Concentrated formic acid
Concentrated, strong mineral acids
Powerful oxidizing agents (chromic acid, etc.)
Halogens (chlorine, bromine, etc.)

Moisture Resistance

"Zytel" is not chemically affected by water. It does, however, absorb moisture up to a point. At room temperature and 50% relative humidity, the moisture equilibrium is 1.4%. In room temperature water, the moisture equilibrium is 3.6%. Since, for the most part, wire and cable involves wall thicknesses in the range of ten mils, we find that both of the above points are reached in from one to two weeks. However, it is extremely important to realize that equilibrium is reached both in and out of water, and that the absorption does not progress to any high degree.

Electrical Properties

The electrical properties of "Zytel" make it suitable, in many cases, as insulation at commercial power frequencies. For example, "Zytel" 33, as tested to ASTM D-149-44T ranges from 400 VPM on a short time test to 470 VPM on a step-by-step test. All the electrical properties vary with moisture absorption and temperature. Figures 1 to 4 illustrate the effect of moisture absorption and temperature on the electricals of "Zytel" 33.

EFFECT OF MOISTURE ABSORPTION ON VOLUME RESISTIVITY OF "ZYTEL" 33 (AT 25° C.)

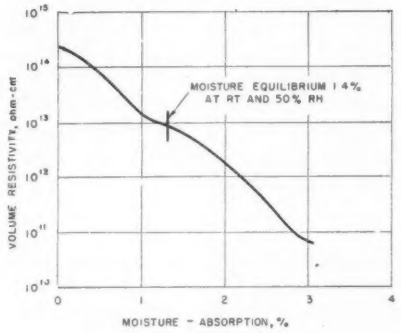


FIGURE 1

NOTE: In cut above on graph 14% should read 1.4%.

EFFECT OF MOISTURE ABSORPTION ON DIELECTRIC CONSTANT OF "ZYTEL" 33 (AT 100 CYCLES, 25° C.)

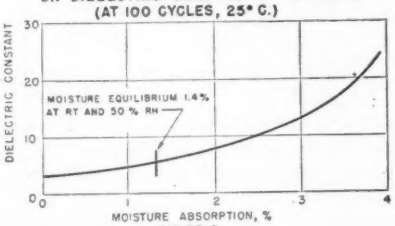


FIGURE 2

EFFECT OF MOISTURE ABSORPTION ON POWER FACTOR OF "ZYTEL" 33 (AT 100 CYCLES, 25° C.)

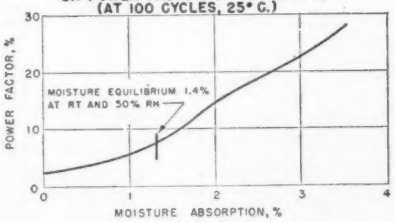


FIGURE 3

EFFECT OF TEMPERATURE ON DIELECTRIC CONSTANT OF "ZYTEL" 33

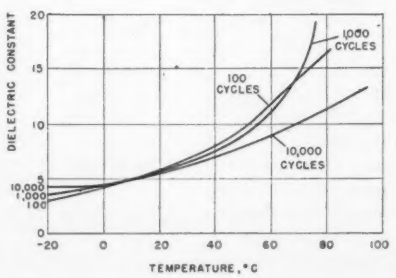


FIGURE 4

TABLE VI

MIL-W-16878C

Aircraft Hook-Up Wire, 100°C Type

7W#28 T.C (.037) - 16 mils Vinyl - 3-6 mils "Zytel" 33

Test	Requirement	With "Zytel"33	Without "Zy"33
Heat resistance 4 days @ 150°C	Dielectric strength 3 KV	O.K.	Fail
Cold Bend 4 hrs. @-54°C 2" mandrel	Dielectric strength 3 KV	O.K.	Fail

TABLE VII

MIL-W-5086

Aircraft Hook-Up Wire

7W#28 T.C. (.037) — 16 mils. Vinyl - 4-6 mils "Zytel"

Cold Bend - 55°C	Pass	Fail
Abrasion Resistance (Continuous tape)	"	"
Fungus Resistance	"	"
Oil Absorption (Kerosene aircraft lubricating oil @120°F for 20 hrs.	"	"
Immersion (Aviation gas, aviation oil, ethylene glycol, alcohol, hydraulic fluid, salt water, and carbon tetrachloride)	"	"

One very important point to remember is the moisture equilibrium of "Zytel" 33. This is represented on each moisture chart to illustrate the approximate value for each property when equilibrium has been reached. It is recommended that "Zytel" as a primary insulation should be protected from moisture to obtain optimum electrical properties.

Weathering

Until recently, we did not have a "Zytel" nylon resin which possessed good weathering properties. "Zytel" 37X is still designated as experimental and contains finely divided carbon black specially introduced.

★ ★ ★

To date, samples of wire jacketed with "Zytel" 37X have been exposed in a weatherometer (unfiltered arc) for 1500 hours without showing any cracks. This testing continues and samples have been mounted for outdoor exposure. Another experimental black product, "Zytel" 107X, is also under study. It does not appear to have weather resistance equal to 37X, but the melting point and mechanical strength are higher.

Specifications

The two most important government specifications are MIL-W-16878C and MIL-W-5086, both of which involve a "Zytel" jacket over a PVC insulation. We believe that these specifications illustrate most graphically the effect of a thin wall of "Zytel" over a primary insulation. Tables VI and VII show those tests in each specification where the vinyl alone fails unless jacketed with "Zytel" 33.

Product Line

Table VIII lists the "Zytel" wire and cable family by numbers, their actual present uses and certain suggested uses which we feel will be part of the future history of "Zytel" in wire and cable.

★ ★ ★

Close production controls are insuring the homogeneity of these compounds, while new compounds are continually under investigation.

TABLE VIII
THE "ZYTEL" WIRE AND CABLE FAMILY

1) "ZYTEL" 33—

heat stabilized, with good abrasion, deformation and solvent resistance.

USES:—

Control Cable (jacket over insulation) Jacket on radiant heating wire
Jacket on radio and TV hook-up wire
Jacket on gasoline station wire
Jacket for aircraft wires
Primary insulation for oil well cables.
Primary insulation for blasting cap wire.
Primary insulation for thermocouple wire.

2) "ZYTEL" 37X—

Based on "Zytel" 33, with finely divided carbon black specially introduced for exceptional weathering.

SUGGESTED USES:

Jacket over polyethylene tree wire.
Jackets for power cables.
Jacket for telephone cables.
Jacket for Navy tow cables.
Jacket for ignition cable (polyethylene).
Primary for switchboard wire.

3) "ZYTEL" 3606—

Contains special heat and light stabilizers.

USE:

Jacket for WD-1 Infantry field wire.

4) "ZYTEL" 61 & 63—

Alcohol-soluble (but resistant to gasoline and oil): dispersible in water; flexible, with good resistance to abrasion and moisture.

USES:

Coatings on braided glass and braided cotton constructions for abrasion resistance.

5) "ZYTEL" 69—

Contains a special plasticizer for flexibility.
Excellent impact resistance.

USES:

Jacket for wire rope.
Jacket for gun firing wire.
Jacket for ground wires (transparency).
Jacket for tiller wire.

6) "ZYTEL" 107X—

Based on "Zytel" 101, with carbon black for weather resistance.

Summary

This paper has attempted to present a well rounded picture of "Zytel" nylon resin for use in wire and cable manufacture. Emphasis has been placed on the excellent mechanical and chemical properties of "Zytel" which make it particularly effective as a jacketing material, and in certain applications as a primary insulation.

★ ★ ★

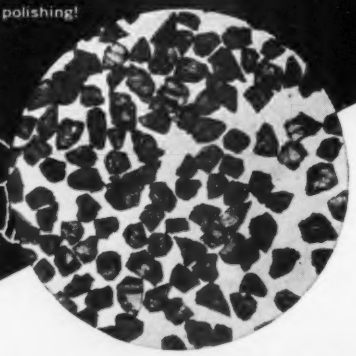
The electrical properties of "Zytel," while affected by moisture, still make it suitable for use as a general insulating material at commercial power frequencies.

(*Please turn to page* 1052)

ELGIN

gives you a close look at finishing economy

Microscopic view of Elgin Diamond. Note the uniform size of all the particles . . . the key to faster, finer, money-saving polishing!



HERE IS WHY PRECISION GRADED ELGIN DIAMOND CUTS COSTS!

In lapping and polishing, uniformity of diamond particles is the reason why Elgin Diamond cuts costs . . . offers highest finishing economy. From pure virgin diamond to final product, through crushing, grading and compounding, every step of production is controlled in Elgin's laboratories. The finest grades are precisely separated by Elgin's exacting "layers of water" process. In each grade, diamond particles are of uniform size—none are oversize so they scratch. Instead, you get a finer, faster, lower cost finish . . . every time! So place your confidence in Elgin Diamond . . . write for specific application data today!

Ask for a free demonstration!

ABRASIVES DIVISION
Dept. G

ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

The Measurement of Small Resistance Changes

by Clifford C. McMahon
Research Physicist
Hoskins Manufacturing Co.
Detroit, Michigan

Two bridge circuits are described for measuring and calculating $\triangle R/R_o$, where $\triangle R$ is a small change in a resistance R_o. The equipment is being used in the measurement of temperature coefficients of resistance of resistor alloys.

Introduction

The following bridge circuits were devised to expedite the measurement and calculation of the mean temperature coefficient of resistance of resistor alloys. The usual method, in which resistances R_O and R_T are measured at temperatures T_O and T, and the mean temperature coefficient calculated from $_a = (R_T - R_O)/R_O(T_O - T)$, requires great accuracy in the resistance measurements if an acceptable value of $_a$ is to be obtained, and if R_O is small it is difficult to do the work on a production basis. The methods reported here measure $(R_T - R_O)/R_O$ directly.

Circuit 1

In Fig. 1, R and R^1 are two fixed resistors, nominally equal in value, R_S is a variable resistor, AA are the leads by which the specimen is connected into the circuit and BB a pair of compensating leads.

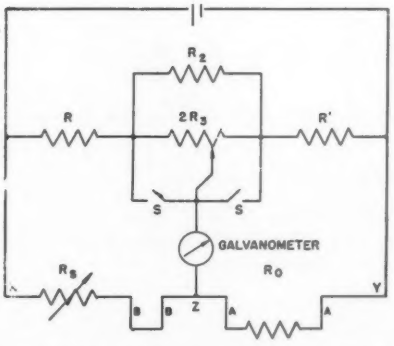


Fig. 1—Circuit diagram, circuit 1 for small $\Delta R/R_o$.

With the specimen at a temperature T_O the bridge is balanced using R_S with the switch S closed. Clearly R/R_S is thus made equal to R^1/R_O. Now let the resistance of the specimen change from R_O to $R_O + \triangle R$. With switch S open, the bridge is rebalanced using $2R_3$.

By transforming the delta network, composed of R_2 and the two segments of $2R_3$ to the left and right of the wiper to its equivalent star, it can be shown that, to a very close approximation,

$$\frac{\Delta R}{R_o} = \frac{2r}{A} + \frac{d^1(R_3+r)}{A R_1} \qquad (1)$$

where

$$A = R + 2R_3 R/R_2 + R_3 - r$$
$$d_1 = R - R^1$$

and r is the resistance between the electrical center of $2R_3$ and its wiper.

★ ★ ★

The approximation made in reaching equation I is that d^1 is small compared with the other resistances.

★ ★ ★

If R_O change to $R_O - \triangle R$, it can be shown similarly that, to the same approximation,

$$\frac{\Delta R}{R_o} = \frac{2r}{B} - \frac{d^1(R_3+r)}{B R_1} \qquad (2)$$

where

$$B = R + 2R_3 R/R_2 + R_3 + r$$

★ ★ ★

For a certain range of values of $\triangle R/R_O$, r is small compared with the R in the denominators of equations 1 and 2, and in this range A and B may be regarded as constants. A bridge may therefore be constructed with a linear scale reading directly in $\triangle R/R_O$. The range of values of $\triangle R/R_O$ for which equations 1 and 2 are linear naturally depends upon the accuracy required in $\triangle R/R_O$, and for 1% accuracy, they are linear to $\triangle R = 0.02R_O$.

Circuit 2

For values greater than $\triangle R = 0.02R_O$, a second circuit was devised and is shown in Fig. 2 in which, nominally, $R_1 = R_4 = R_5$, $R_2 = R_3$ and R_S, R_O, AA and BB have their previous significance.

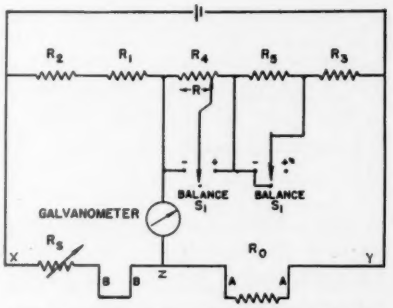


Fig. 2—Circuit diagram, circuit 2 for large $\Delta R/R_o$.

With the specimen at its base temperature, the bridge is balanced using R_S with switch S_1 at "balance." In this position, R_S is shorted out and $R_1 + R_2 = R_4 + R_3$, so that $R_S = R_O$. Now let R_O change to $R_O + \triangle R$. With S_1 at "plus," the bridge is rebalanced using R_4, and it can be shown that

$$\frac{\Delta R}{R_o} = \frac{R}{R_3+R_4} + \frac{r_5}{R_3+R_4} \qquad (3)$$

where

$$r_5 = R_5 - R_4$$

★ ★ ★

Similarly, if R_O change to $R_O - \triangle R$, a second balance using R_4 with S_1 at "minus" will lead to

$$\frac{\Delta R}{R_o} = \frac{R}{R_3+R_4} \qquad (4)$$

and the circuit of Fig. 2 can be used for all values of $\triangle R/R_0$, $(R_3 + R_4)^{-1}$ serving as a multiplying factor. It will obviously be chosen to have some convenient value.

Construction

Two bridges were constructed embodying these circuits, each one having a number of ranges of $\triangle R/R_0$. Range changing was accomplished with Circuit 1 by switching in other values of R_2, and with Circuit 2 by switching in other pairs like R_2 and R_3. The use of a number of such pairs introduces additional small error terms in equations 3 and 4, which can be calculated quite easily. They arise from the fact that, in general, the initial balance is made on a range different from that used in the final balance, since it is sometimes difficult to anticipate the magnitude of $\triangle R$, and they will disappear if the ratio of R_2 to R_2^I is made the same as that of R_3 to R_3^I, where the primes refer to the pair of resistors used on the second balance.

★ ★ ★

The bridges were built to accommodate five specimens at a time, necessitating a separate balancing resistor for each specimen. These were connected in parallel across the points X and Y in Figs. 1 and 2, the galvanometer being switched to the points corresponding to Z by a selector switch. Figure 3 shows the bridge based on Circuit 1. The balancing resistors are the five sets of three knobs in the middle panel, the lower panel being a power supply and the upper the bridge.

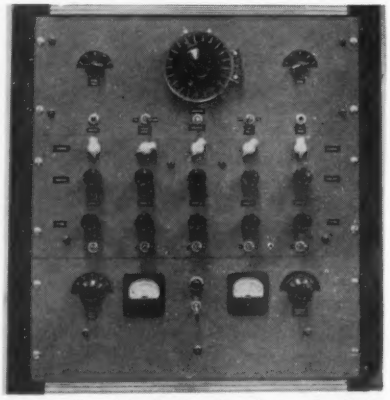


Fig. 3—Complete bridge, based on circuit 1.

★ ★ ★

Additional circuitry was built to allow $\triangle R/R_0$ to be recorded continuously on a recording potentiometer. Referring to Fig. 4, in which R_0 is the specimen resistance, and R_s its balancing resistor, if R_s is adjusted until the potential difference across AB is zero, then $R_0 = R_s$. If now R_0 change, a potential difference appears across AB, and it can be shown simply that

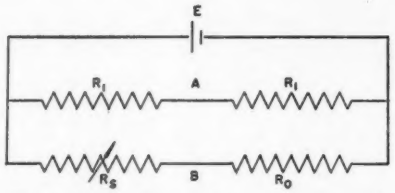


Fig. 4—Circuit diagram for continuous recording of $\Delta R/R_0$.

$$\frac{\Delta R}{R_0} = \frac{4V}{E-2V}$$

where

V = p.d. across AB
E = bridge voltage

★ ★ ★

For small $\triangle R/R_0$, 2V is small compared with E so that

$$\frac{\Delta R}{R_0} = \frac{4V}{E}$$

and a plot of V on the potentiometer is thus a plot of $\triangle R/R_0$.

Join

THE WIRE ASSOCIATION

Besides the direct benefits of being a member, those who join the Association can enjoy the feeling that they are uniting in the cooperative effort to better conditions in the industry.

ANNUAL DUES: $15.00

For this you receive the Association's Official Publication for one year—WIRE AND WIRE PRODUCTS.

You also get a copy of the directory—the WIRE AND WIRE PRODUCTS BUYERS' GUIDE AND YEARBOOK OF THE WIRE ASSOCIATION.

You are entitled to a free question and answer service on technical and operating problems.

You can attend the Annual Convention and the Regional Meetings of the Association at a saving in registration fees.

Personal contacts, too, are an advantage of the meetings.

Write today for a booklet on the Association and an application card.

THE WIRE ASSOCIATION

RICHARD E. BROWN, *Executive Secretary*

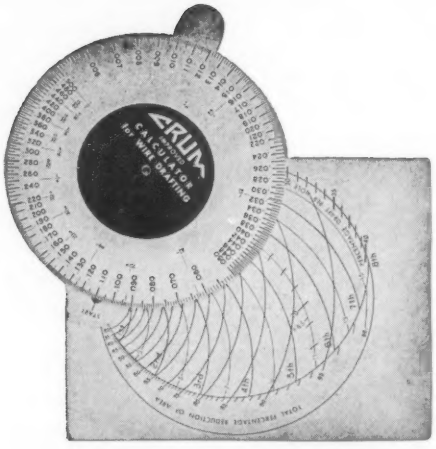
453 MAIN STREET • **STAMFORD, CONN.**

SAVE SET-UP TIME WITH THE . . .

CRUM CALCULATOR

FOR WIRE DRAFTING

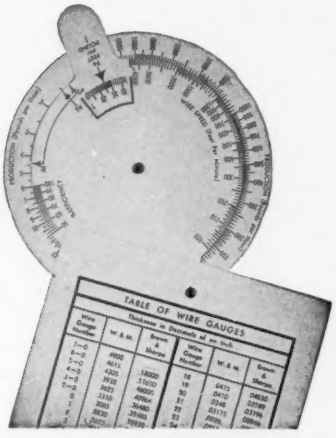
Useful and Accurate!



Front view of Crum Calculator.

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. Provide quicker and more accurate information on die sizes and reduction areas;
2. Calculate wire production rates for various speeds and efficiencies.



Reverse view of Crum Calculator.

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving —no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

THE PRICE: $5.00 EACH

Send your orders to:

WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

(Exclusive distributors)

Rope Wire Questions and Answers

We would be interested to receive information on the following questions:

1. **The** influence of the surface decarburization on the life of ropes, especially ropes of larger sizes, such as hoisting ropes and haulage ropes.

2. **The** influence of the percentage of the manganese content (0.3 - 0.7 respectively 0.7 - 1.2%) and the kind of manufacturing (air and lead tempering) on the physical properties of wires.

3. **The** brittleness of steel wire at the hot galvanizing.

★ ★ ★

These questions were sent to a number of concerns producing rope wire, replies to three of which are quoted.

Three questions asked by one of our readers elicited the replies quoted here, on which the questioner makes some observations of his own.

The exchange of ideas is published in the belief that it will be of value to others producing rope wire. In exchanges of information of this nature we do not publish the names of either the persons asking question or of those who reply.

Reply No. 1

1. Considering rope wire itself, decarburization of any type or to any extent has a detrimental effect upon its fatigue life. Total decarburization should never be associated with a high carbon rope wire, and, of course, with proper wire rod and wire making practice, will never become a factor to be considered. Partial surface decarburization is probably present to a small extent in most grades of commercial rope wire. Unless extreme care and special methods of preliminary treatment are resorted to, its presence is unavoidable. However, so long as it does not exist in the wire to too great a depth, I believe that its effect upon the fatigue life of the finished wire rope is negligible and need not be considered. I hold this opinion because of the many other factors involved which are of greater importance. Among these may be mentioned the construction of the strands of the rope, the strand and rope lays, the nature of the wire rope center, and unpredictable service conditions to which the wire rope is subjected.

2. I presume here that the reader has in mind the effect of differences in the manganese content upon the general quality of rope wire of a given carbon content. With a given carbon content, the 0.3/0.7% manganese and the 0.7/1.2% manganese steels will give rope wire of equal quality provided the final patenting is proper and efficient. The big difference between these two steels lies in their response to patenting. The higher manganese steel will generally respond better giving, under a certain set of patenting conditions, a more desirable grain structure for subsequent cold drawing. In other words, it is, shall I say, easier to patent the higher manganese steel. Lead, or molten salt, quenching following the patenting heating cycle will generally result in a more satisfactory and serviceable rope wire.

3. The question of brittleness of steel wire at hot galvanizing is one upon which I cannot briefly comment because of its complex nature and the multitude of factors which can be and are involved.

Reply No. 2

1. We are not in position to give you information concerning surface decarburization on the life of ropes.

2. The manganese content of steel wire influences the cooling rate which is dependent, to some degree, upon the cross section. In our rope wire steels of .55 to .80% carbon we hold the manganese to a range of .55 to .70%. We do not hestitate to air cool from a patenting temperature of 1750°F in all sizes down to .65"; all sizes smaller are quenched in lead at 1000°F.

★ ★ ★

In the spring steels of .65 to .75% carbon with .80 to 1.00% manganese the critical size is .120". In both cases, air cooling wires smaller than the critical sizes will produce extremely brittle sections with no ductility whatever. The tensile strength of the wires properly patented will be in the range of 150,000 to 165,000 psi, whereas the severely quenched wires would probably be well in excess of 300,000 psi.

3. We assume that the reader has in mind the hot dip galvanizing of high carbon steels. We have found that we have reduced the possible embrittlement in the zinc pan by using a fine grain steel patented 1750°F and quenched in lead at 1000°F and restricted the total drafting to a maximum of 80% in drawing the wire. The length of time which this material is in the smelter pan has great bearing on the possible embrittlement. When the temperature of the wire in the smelter pan reaches approximately 700°F, embrittlement is a possibility. We have found a great deal of success in running this type material by the Hermanized method at takeup speed of 40 to 60 FPM, depending on the size of the wire.

Reply No. 3

1. We know that decarburization reduces the life of wire rope—both wear and fatigue. As to how much is a moot question.

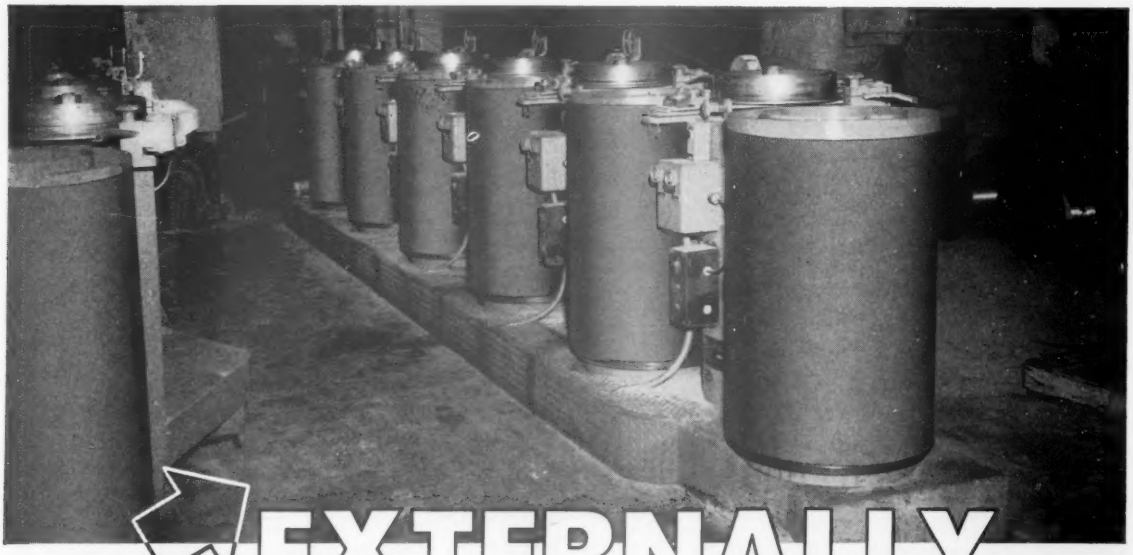
2. We favor lead patenting—it gives us better rope service. Torsions are a little lower, however. We have never used high manganese even when we used air patenting. With lead patenting we favor lower manganese.

3. We have always favored "pigtail tests", and where we have done that have had no marked difficulty.

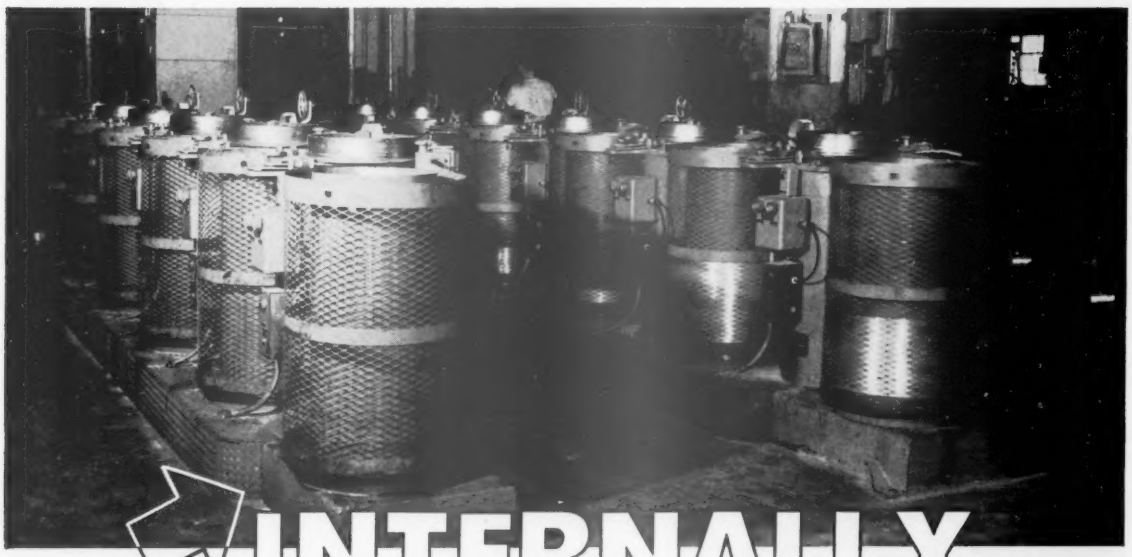
(*Please turn to page* 1053)

Coulter & McKenzie DRAW-PAK *Equipment*

WILL PAY YOU EXTRA DIVIDENDS



EXTERNALLY



INTERNALLY

It's a fact! Users of DRAW-PAK equipment have realized tremendous profits INSIDE THE PLANT as well as in OUTSIDE SHIPMENTS TO CUSTOMERS.

To improve the efficiency of your in-plant wire drawing and processing operations while supplying large, clean, easy-to-use wire packages write or phone immediately for detailed information.

Patent No. 2,732,060—other U. S. and foreign patents pending.

35 UNION AVENUE

TELEPHONE EDISON 5-1101
LIEBER'S CODE "MACKENZIE"

THE COULTER & McKENZIE MACHINE CO., INC.

SINCE 1843 BRIDGEPORT 7, CONNECTICUT, U. S. A. INCORPORATED 1881

Wire Works Wonders On Today's Academic Scene

by Ruth April
Maryland Schoolteacher

The author is a teacher and what she has to say in this description of the uses of wire in the classroom is based on personal experience. Wire caricatures, she states, are increasing in use to create basic art forms. And, who knows, it also may be helping to make some good wire men out of the pupils.

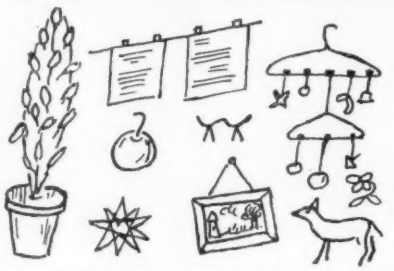
Many and diversified are the "media" used in the elementary and high schools in their curricula of today, as all sorts of materials lend themselves to the "modern academic trend." And now, wire has joined the lengthy list of helps for the teacher and students in their many projects!

★ ★ ★

Interesting projects involving all sizes and kinds of wires have evolved. And, they vary with the age level of the youngsters. Often it happens that wire has found its way into the classroom in somewhat of an incidental way, such as the finding of it by a curious little boy, who, in his spare time twists it and finds it can do almost remarkable things. Wire is especially of value to children in their projects because of its strength and durability, yet ease of handling, once the proper tools and techniques are taught.

★ ★ ★

In art projects in the schools, wire plays its biggest role. It is the basic structure or form for many papier-mache animals and figures that are built up around it, using layers of paper and paste. Wire bends into the many shapes the art instructor needs to show the students how to sketch varying body positions. Wire becomes a fine means of holding and exhibiting the fresh and dried flower arrangements in that art class. Wire is permanent, and of real value. Wire netting and single lengths of it are indispensable for setting up exhibits and for models requiring it. Widely versatile, it is a most creative medium for children, who combine it with paper, paint and clay for unusual projects. It surpasses adhesives for lasting and anchoring down of difficult-to-hold materials.



Some classroom uses for wire

★ ★ ★

In science class work, wire is always kept on hand on the supply shelf. It is used in many experiments that will test and show its strength under stress. Respect for wire's potential is built up, especially in electrical set-ups. Studies of metals include displays of all kinds of wiring and the specific uses for each. Older students are adept at exploring the field and coming up with some original uses for wires, often for their own convenience. Special wiring enables the making of telephone experiments between rooms. And wire supports plants.

★ ★ ★

The teacher finds wire superior to rope or string, when using it to stretch across the room and to display upon it various art projects needing drying, observation or special charts for continuous viewing. It lasts indefinitely, taking the everyday treatment it gets in its stride. Wires for puppets in dramas are sometimes used. And wiring small vials of soils or other products for social studies allows viewing without spilling. Wire is used to make Christmas tree ornaments and a beautiful project called a "mobile". The mobile is various kinds and lengths of wires, hooked successively together that, because of the light weight, the slightest breeze will move. On them may be attached paper animals, Christmas cut-outs or geometric figures.

★ ★ ★

Arithmetic classes find wire of value, too. Lengths of it are used for realistic problems and in making intricate models of complex arithmetical figures. Wire-bound boxes and crates have many uses and are often measured for a study of rectangular and cubic measurement. Wire strengthens such boxes for much use.

★ ★ ★

All sorts of odd pieces of wire are kept in the supply box at the classroom. It often becomes the "hanger" for putting a plaster of Paris or paper plaque upon the wall. It is necessary for adequate hanging of balls to explain the positions of planets or for signs to be hung. Once wire is used, both the teacher and students realize the job is **done** with permanency and there will be no wearing out of the object. Wire screening and bits of wire provide unusual sound effects in dramas and rhythm-band music activities, also.

★ ★ ★

A bit of exploration into the classroom of today would reveal some almost amazing uses of wire . . . for it would be discovered in use everywhere. Those in the hardware and wire trade are always surprised to see that wire is a standard item for modern classroom use. Its use is no longer incidental, but vital!

THE ANNUAL CONVENTION OF THE WIRE ASSOCIATION

LA SALLE HOTEL, CHICAGO, ILLINOIS, MONDAY THROUGH THURSDAY OCTOBER 14-17, 1957

The Wire Association's Headquarters at The La Salle Hotel
Will be open each evening from Sunday, October 13th, except Wednesday night.
YOU ARE CORDIALLY INVITED TO CALL AND MEET OTHER WIRE INDUSTRY MEN

THERE WILL BE A REGISTRATION FEE OF $11.00 FOR MEMBERS AND $13.00 FOR NON-MEMBERS, INCLUDING AN ANNUAL LUNCHEON TICKET, FOR ALL THOSE ATTENDING THE TECHNICAL SESSIONS AND MEETINGS. PLEASE HAVE YOUR ASSOCIATION MEMBERSHIP CARD WITH YOU AND SHOW IT WHEN REGISTERING.

ADMISSION WILL BE BY BADGE ONLY—PLEASE WEAR IT.

THE WIRE ASSOCIATION PROGRAM COMMITTEE FOR THE 1957 CONVENTION

GENERAL PROGRAM CHAIRMAN
John L. Sanderson
Superintendent, Wire Mills
Keystone Steel & Wire Company
Peoria, Illinois

GENERAL ACTIVITIES

EXECUTIVE SECRETARY

Richard E. Brown
The Wire Association
Stamford, Conn.

REGISTRATION

R. S. Spengel, Asst. Exec. Secy.
The Wire Association
Stamford, Conn.

ENTERTAINMENT

Eber J. Hubbard, Pres.
Hubbard Spool Co.
Garrett, Ind.

All papers presented at the Convention by members of The Wire Association are eligible for consideration for the Annual Medal Award, and will be voted upon by the Board of Directors at the Next Spring meeting of that body.

FERROUS DIVISION

CHAIRMAN

John H. Corson, Mgr. of The Laboratory
Carpenter Steel Co., Reading, Pa.

COMMITTEE MEMBERS

William R. Cook, Asst. Supt., Wire Mill
Union Wire Rope Corp.
Kansas City, Mo.

Carleton W. Garrett, Metallurgical Eng.
Jones & Laughlin Steel Corp.,
Aliquippa, Pa.

William H. Louder, Supt., Wire Mills
Bethlehem Steel Corp.
Williamsport, Pa.

Gordon T. Spare, Project Eng.
American Steel & Wire Div.
United States Steel Corp.
Cleveland, Ohio

Technical papers are preprinted in the October issue of Wire and Wire Products insofar as possible. Titles to papers accepted will be given to The Wire Association and duly copyrighted at the time of publication.

NON-FERROUS DIVISION

CHAIRMAN

E. D. Bent, Chief Engineer
Wire and Cable Division
Northern Electric Co., Lachine, P.Q., Can.

COMMITTEE MEMBERS

Samuel C. Avallone, Dir. Met.
Electric Cable Works,
American Steel & Wire Div.,
U. S. Steel Corp., Worcester, Mass.

Richard E. Hutchinson, Supt.
Wire Drawing, Kaiser Aluminum
and Chemical Corp., Newark, Ohio

Alexander A. Kerr, Supt. Prod.,
Electrical Wire Div.
John A. Roebling's Sons Corp.
Trenton, N. J.

J. F. Stoltz, Eng., Ironwork and
Clearing Prod., Hawthorne Works,
Western Electric Co., Chicago, Ill.

All wire mill men and wire mill suppliers are invited to attend this convention, see how the Association functions and participate in the activities. Simultaneous technical sessions for Ferrous and Non-Ferrous Divisions are held.

REGISTRATION AND TECHNICAL MEETING ROOMS ARE ON THE MEZZANINE. Please be prompt in your arrival for the technical sessions. Those with rooms for entertainment are requested NOT TO KEEP THEM OPEN during the technical sessions.

MONDAY, OCTOBER 14th

9:00 A.M.
REGISTRATION

10:00 A.M.
DIRECTORS' MEETING

12:30 P.M.
PROGRAM COMMITTEE LUNCHEON

THE CONVENTION PROGRAM

LA SALLE HOTEL, CHICAGO, ILLINOIS, OCTOBER 14-17, 1957

MONDAY MORNING—

9:00 A.M. Registration Desk opens on the Mezzanine Floor.

10:00 A.M. Annual Meeting of the Board of Directors of The Wire Association.

12:30 P.M. Directors' Luncheon for Program Participants. Address of Welcome by Tom M. Girdler, Jr., President, The Wire Association.

FERROUS DIVISION TECHNICAL SESSIONS

MONDAY AFTERNOON—2:00 P. M.

CHAIRMAN OF MEETING

John M. Corson, Manager of The Laboratory
The Carpenter Steel Co., Reading, Pa.

SYMPOSIUM ON WIRE PLATING

PAPER: "Survey of Finishes and Processes"	by R. T. Gore, Market Development Eng. Metal and Thermit Corp., Rahway, N. J.
PAPER: "Plating Wire for Eye Appeal"	by O. B. Lusk, Chief Inspector, United Steel & Wire Co., Battle Creek, Mich.
PAPER: "Wire for Eye Appeal"	by L. L. Johnson, Engineering Specialist Philco Corporation, Philadelphia, Pa.
PAPER: "Progress in Vertical Storage"	by A. F. Anjeskey, Sales Mgr., Cleveland Tramrail Div. Cleveland Crane & Engineering Co. Wickliffe, Ohio

TUESDAY MORNING—9:30 A.M.

CHAIRMAN OF MEETING

William R. Cook, Assistant Superintendent, Wire Mill
Union Wire Rope Corp., Kansas City, Mo.

PAPER: "Combined Hot Rolling and Patenting of Rod"	by Dartrey Lewis, Chief Eng., Res. & Devel. John A. Roebling's Sons Corp., Trenton, N. J.
PAPER: "A Simplified System for Carbon Restoration"	by John Arnold, Chief Engineer Lee Wilson Engineering Co., Inc., Cleveland, Ohio
PAPER: "Comparison of Gas and Electric Strand Annealing Furnaces"	by Harold Notarius, Mechanical Engineer Wilbur B. Driver Co., Newark, N. J.
PAPER: "Furnaces for the Heat Treatment of Wire"	by John P. Zur, Chief Eng., Industrial Furnace Div. Sunbeam Corp., Chicago, Ill.
PAPER: "Continuous Electric Direct Resistance Method for Heat Treating of Steel Wire"	by Oscar C. Trautman, President The Trauwood Engineering Co., Cleveland, Ohio

TUESDAY AFTERNOON—2:00 P.M.

CHAIRMAN OF MEETING

Gordon T. Spare, Project Engineer, American Steel & Wire Div.
United States Steel Corp., Cleveland, Ohio

PAPER: "The History of and New Developments in Wire Packaging"	by Fred J. Bieber, President Acrometal Products, Inc., Minneapolis, Minn.
PAPER: "Wire Packaging System"	by E. Jefferson Crum, Technical Consultant Riderwood, Md.
PAPER: "Recent Developments in Steel Wire Drawing Machinery"	by James E. Spearman, Asst. to the President and Maurice A. Nye, Chief Eng. The Vaughn Machinery Co., Cuyahoga Falls, Ohio
PAPER: "A Weldable, Hardenable 12% Chromium Alloy"	by W. R. Kegerise, Metallurgist-Development The Carpenter Steel Co., Reading, Pa.

WEDNESDAY MORNING—9:30 A.M.

CHAIRMAN OF MEETING

Carleton W. Garrett, Metallurgical Eng., Product Development Div.
Jones & Laughlin Steel Corp., Aliquippa, Pa.

PAPER: "Appropriate Rods for Appropriate Wire"	by Ivan P. De Witte, C.E., Mgr. of Res. & Control Trefileries Leon Bekaert, Zwevegem, Belgium
PAPER: "Mechanical Blast Cleaning of Wire Rod"	by Kenneth J. Sorace, Chief Project Eng. Lamson & Sessions Co., Cleveland, Ohio and Gilbert D. Dill, Sales Eng., Chg. Steel Div. Wheelabrator Corp., Mishawaka, Ind.
PAPER: "Stainless Steel Cold Heading Wire"	by S. E. Tyson, Metallurgist-Stainless Steels The Carpenter Steel Co., Reading, Pa.
MOTION PICTURE: "The Long Pull"	Shown through the courtesy of the Bethlehem Steel Company, Bethlehem, Pa.

THE CONVENTION PROGRAM

LA SALLE HOTEL, CHICAGO, ILL., OCTOBER 14-17, 1957

NON-FERROUS DIVISION TECHNICAL SESSIONS

MONDAY AFTERNOON

CHAIRMAN OF MEETING

R. E. Hutchinson, Assistant Production Superintendent,
Kaiser Aluminum & Chemical Corp., Newark, Ohio.

PAPER: "Production Control—Functions and Organization"	by James D. Donovan, Asst. Production Superintendent, Kaiser Aluminum & Chemical Corp., Newark, Ohio.
PAPER: "Aluminum for Fastener Production"	by O. L. Burtenshaw, Senior Metallurgist, Kaiser Aluminum & Chemical Corp., Newark, Ohio.
PAPER: "Oxide Coatings on Aluminum Wire"	by A. A. Defoe, Chief Engineer, Electrical Conductor Engineering Dept., Aluminium Laboratories Limited, Kingston, Ont., Canada

TUESDAY MORNING

CHAIRMAN OF MEETING

J. F. Stoltz, Engineer, Rod and Wire Manufacture, Western Electric Co., Chicago, Ill.

PAPER: "Continuous Vulcanization of Butyl Insulated High Voltage Cable"	by A. L. Rosener, Jr., Process Development Engineer, John A. Roebling's Sons Corp., Trenton, New Jersey.
PAPER: "A Practical Approach to the Extrusion of Thermoplastics"	by Don Craft, Sales Service Lab., E. I. du Pont de Nemours & Co., Wilmington, Delaware.
PAPER: "A Method of Controlling the Contour of Tungsten Carbide Dies Used in Drawing Copper Wire"	by W. R. Moyers, Chief Eng., Wire Drawing and Enameling, and G. M. McLeod, Prod. Eng., Wire Drawing and Enameling Dies, Western Electric Company, Inc., Tonawanda Plant, Buffalo, New York.

TUESDAY AFTERNOON

CHAIRMAN OF MEETING

A. A. Kerr, Superintendent of Production,
John A. Roebling's Sons Corporation, Trenton, New Jersey.

PAPER: "Weighing Samples of Wire to Determine Accurately the Hole Size of Fine Gage Diamond Dies"	by W. R. Moyers, Chief Eng., Wire Drawing and Enameling, and G. M. McLeod, Prod. Eng., Wire Drawing and Enameling Dies, Western Electric Company, Inc., Tonawanda Plant, Buffalo, New York.
PAPER: "Standardization of Torque Values for Stiffness Testing of Wires Used as Radio Grid Siderods"	by J. R. Howell, Engineer in Charge, Engineering Services, Sylvania Electric Products Inc., Warren, Pennsylvania.
PAPER: "Buried Distribution of Telephone Circuits"	by C. C. Lawson, Plant Construction Eng., Bell Telephone Laboratories, Inc., Murray Hill, New Jersey.
FILM: "Cable Makers"	Shown through the courtesy of Rome Cable Corp., Rome, New York

WEDNESDAY MORNING

CHAIRMAN OF MEETING

S. C. Avallone, Electric Cable Works, American Steel & Wire Div.,
U. S. Steel Corporation, Worcester, Mass.

PAPER: "Weaving of Aluminum Insect Screening"	by Robert E. Hirt, Supt. Wire Mill, Hanover Wire Cloth Div., Continental Copper & Steel Industries, Inc., Hanover, Pa.

THURSDAY MORNING

PLANT INSPECTION TRIPS

NON-FERROUS DIVISION TOUR—Plant Inspection Trip to Revere Copper & Brass.

WEDNESDAY PROGRAM (Cont'd.)

AT 1:00 P.M.—THE ANNUAL WIRE ASSOCIATION LUNCHEON

(Century Room, 19th Floor)

LADIES ARE WELCOME LADIES ARE WELCOME

THE PRESENTATION OF AWARDS FOR 1956 PAPERS

MEDAL AWARD: To George A. Sweitzer, Jr., Metallurgical Investigator, Jones & Laughlin Steel Corp., Aliquippa, Pa., for his paper: "Electromatic Oil Tempered Wire."

CERTIFICATE OF HONORABLE MENTION (FERROUS DIV.): To N. Dale Montgomery, Metallurgist, Rod and Wire Div., Pittsburgh Steel Company, Monessen, Pa., for his paper: "Control Measures for the Heat Treatment of High Carbon Rods and Wire."

CERTIFICATE OF HONORABLE MENTION (NON-FERROUS DIV.): To John D. Sprowl, Department of Metallurgical Research, Kaiser Aluminum & Chemical Corp., Spokane, Wash., for his paper: "Hot Dip Wire Aluminizing Processes and Alloys."

PRESENTATION OF TWENTY-FIVE YEAR CERTIFICATES by Leslie C. Whitney, Chairman, Board of Past Presidents.

THE MORDICA MEMORIAL LECTURE: "About The Wire Association" by Richard E. Brown, Executive Secretary, The Wire Association, Stamford, Conn.

AT 4:00 P.M.—THE ANNUAL MEETING OF THE WIRE ASSOCIATION

This is the annual business meeting of members of the Association. Your personal attendance is needed and urged to discuss proposals and transact business.

Chairman of Meeting
Tom M. Girdler, Jr., President
The Wire Association

IN THE EVENING BALLROOM, 19TH FLOOR

THE ANNUAL STAG SMOKER—DINNER

6:30 P.M.—Cocktail Bar Opens

7:30 P.M.—Dinner and Show

CHAIRMAN, ENTERTAINMENT COMMITTEE: Eber J. Hubbard, Jr.

COME ONE, COME ALL—ENJOY FELLOWSHIP AND A GOOD SHOW!

THURSDAY MORNING

PLANT INSPECTION TRIPS

FERROUS DIVISION TOUR—Busses will leave the hotel at 9:00 for the tour of the Joliet Works of the American Steel and Wire Division of the U. S. Steel Corp. at Joliet, Ill. Luncheon will be served there through the courtesy of the division.

NON-FERROUS DIVISION TOUR—Busses will leave the hotel at 9:30 for the tour of Revere Copper & Brass mill.

ALL MEN IN ATTENDANCE ARE INVITED TO GO ON ONE OR THE OTHER OF THESE TOURS. BE SURE TO BUY YOUR BUS TICKET IN ADVANCE.

FOR THESE TOURS, ALL PERSONS MUST GO BY BUS. NO PRIVATE CARS MAY BE USED. TO BE ADMITTED, EACH VISITOR MUST WEAR HIS BADGE; NO EXCEPTIONS PLEASE. THESE MEASURES ARE FOR SECURITY, SAFETY AND THE IDENTIFICATION OF VISITORS.

These plant inspection trips conclude the 1957 Convention.

RESEARCH PAPERS ARE PREPRINTED IN THE OCTOBER ISSSUE OF WIRE AND WIRE PRODUCTS.

A summary of the discussions and the Mordica Memorial Lecture will appear in the January issue of Wire and Wire Products.

Papers not received in time for preprinting will be published in the November and December issues of Wire and Wire Products.

SCHEDULING OF PAPERS SUBJECT TO CHANGE IN FINAL PROGRAM

New Trends in High Temperature Cables

by B. J. Mulvey
Application Engineer
Wire and Cable Department
General Electric Company
Bridgeport, Connecticut

This article was published in the March, 1957, issue of the General Electric Review. It is reproduced here for the benefit of our readers through the courtesy of the General Electric Company and with the permission of the General Electric Review.

Many special wire and cable applications involve high-temperature operation, such as the wiring of electric apparatus, switchboards, and equipment in power stations and industrial plants that contain boilers, furnaces, or other heat sources. Additionally, the wiring of cranes, boilers, controllers, and motors for steel mills and locomotives for mine use require special materials. In general, this means that for normal cable life, a heat-resistant cable insulation must be used in any industrial application where ambient temperatures run higher than about 50 C (122 F.).

★ ★ ★

For many years the standard cable construction for high-temperature use consisted of a conductor, a covering of felted asbestos or asbestos roving, and an asbestos braid or lead sheath. Depending on the construction and application details, asbestos-insulated cables can be used at conductor temperatures up to 200 C. But such cables are vulnerable to moisture absorption, which can occur during either light-load or shutdown periods. Varnished cloth tapes inserted between layers of asbestos furnish some moisture resistance. However, a lead sheath over asbestos-varnished cambric insulation offers the most reliable moisture resistance, but limits cable use to a maximum conductor temperature of 110 C.

★ ★ ★

Besides poor moisture resistance, the electrical properties of asbestos also severely limit its use. Its insulation resistance is extremely low compared with almost any other insulation. And the very high power factor and dielectric constant lead to excessive internal losses in the insulation wall on high-voltage applications. For this reason, the material has been generally limited to use in 600-volt applications, with some at 5000 volts.

★ ★ ★

Glass yarns have been used in high-temperature cable design but principally as outer braids for mechanical protection of the primary insulation. The type of impregnant or varnish treatment given glass yarns primarily determines their insulating properties. Glass itself is generally regarded as a spacer rather than an electric insulant.

★ ★ ★

In the late 1930's a mineral-insulated cable—Pyrotenax—was developed in France. Called Type MI in the United States, it consists of one or more solid-copper conductors embedded in closely packed magnesium-oxide insulation and enclosed within a solid-copper tube. Its excellent heat and flame resistance and the inert properties of the refractory magnesium-oxide insulation have made this cable useful in areas subject to severe nuclear radiation. This cable presents three main problems: the hygroscopic nature of the magnesium oxide requires special moisture-seal terminal fittings, the limited length of cable and number of conductors per cable that can be made, and its restriction for

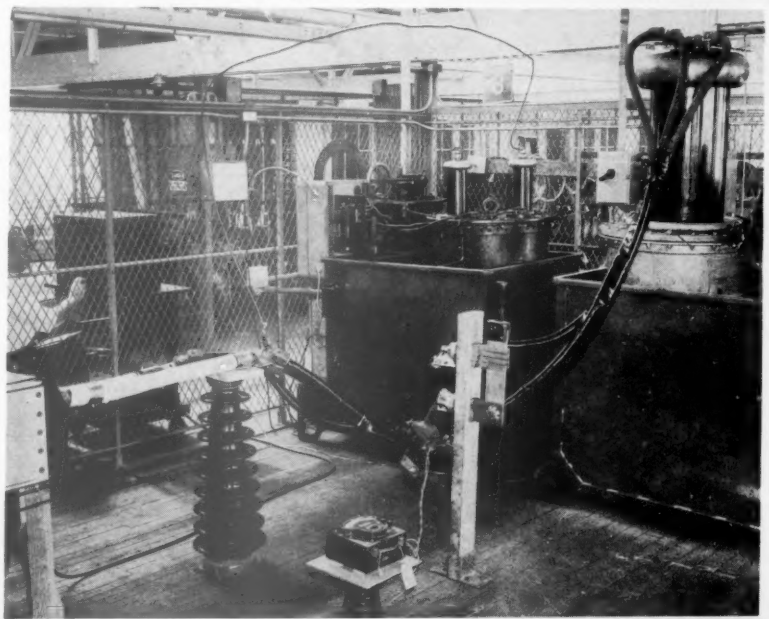


Fig. 1—High current, high voltage load cycle test on 15,000-volt silicone—glass insulated lead cable shows no sign of cable breakdown after 1½ years' continuous test operation. Field conditions are simulated in the heat chamber (white box, left). * * * * * * *

use on 600-volt circuits or less.

Insulation Requirements

The ideal insulation for high-temperature use should be:

- **Suitable for high-temperature use and flexible at low temperatures**
- **Stable electrically over a wide temperature range**
- **Low in power factor and specific inductive capacity**
- **Physically strong enough for fabrication and installation use**
- **Weather, fungus, moisture, and corona resistant.**

★ ★ ★

During the 1930's many attempts were made to improve the heat resistance of natural rubbers by special compounding. Thus the operating temperature of rubber was increased from 50 C for code rubber to 75 C for heat-resistant rubber, but this still did not allow rubber to replace asbestos.

★ ★ ★

About this time the General Electric Research Laboratory became interested in silicones—a laboratory curiosity since 1892—for use in heat-stable insulating materials. The Corning Glass Company also followed this interest and ultimately formed the Dow-Corning Corporation to manufacture these materials. Now in this field are three manufacturers: General Electric, Dow-Corning, and Linde Air Products.

★ ★ ★

After World War II the development of silicone rubber as a cable insulation received tremendous impetus when the U.S. Navy began specifying it for the insulation on Navy cables. Up to that time, silicone-rubber compounds had been extremely weak and difficult to handle during both cable manufacture and installation. The effort expended to meet the Navy specifications led to a great improvement in physical properties, and now silicone rubber most closely approaches the ideal for a high-temperature cable insulation.

★ ★ ★

Called a polyorganosiloxane by the chemist, silicone-rubber gum compounded with certain inorganic fillers and cured with a peroxide-type catalyst gives a rubber-like

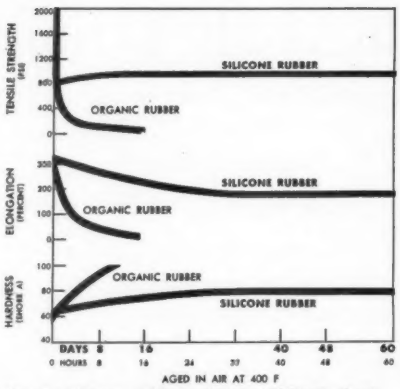


Fig. 2—Silicone rubber retains stabilized physical properties after 60 days' exposure a high temperatures. Abscissa for organic rubber appears in hours; silicone rubber in days.

product. This is but one member of the silicone family that ranges from light liquids through viscous greases to solids. The chemical compositions of the gum vary for specific applications.

Insulation Properties

Some silicone-rubber compounds can, with sufficient care, be extruded on copper conductors. However, in comparing the physical and electrical properties of extruded silicone rubber with commonly used rubber-like insulations, silicone rubber has low tensile strength (See Table). This makes it difficult to extrude heavy walls and limits the cables to a maximum conductor size of 500,000 circular mils (MCM) and a maximum wall thickness of eleven sixty-fourths of an inch for 5000-volt cable.

★ ★ ★

Of course, the main attraction

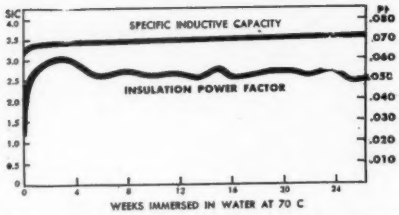


Fig. 3—Low moisture absorption of silicone rubber cable and stability of electrical properties in water insure long cable life in exposed wet locations.

in silicone rubber is its heat resistance. In one test of silicone rubber versus organic rubber at 400 F in air, organic rubber practically disintegrated after 8 hours' exposure (See Fig. 2). On the other hand, silicone rubber after 60 days' exposure had stabilized, with its physical properties only slightly below their original values.

★ ★ ★

Moisture resistance is an important consideration in choosing a cable insulation. Compared with an acceptable value of up to 20 mg, the Underwriters' Laboratory report on silicone-rubber appliance wire shows a test value of 4.5-mg water absorption per square inch of exposed surface. The effects of long immersion on the power factor and the specific inductive capacity (SIC) of a silicone rubber cable sample immersed in 70 C water show the stability of electrical properties in water (See Fig. 3).

★ ★ ★

On the basis of these properties, a fairly complete line of extruded silicone-rubber cables for voltages

(*Please turn to page* 1050)

PROPERTIES OF ELECTRIC INSULATION MATERIALS

Properties	Silicone Rubber	Natural Rubber	GR-S	Neoprene	Butyl	Polyvinyl Chloride	Polyethylene
Maximum operating temperature	150–200 C	75 C	75 C	90 C	90 C	80–105 C	75 C
PHYSICAL							
Elongation (percent)	100–300	500	500	750	550	150	500
Tensile strength (psi)	500–1000	2000	1000	1800	700	2500	1500
Low temperature flexibility	Excellent	Very Good	Good	Good	Very Good	Fair-Very Good	Excellent
Abrasion resistance	Poor	Fair	Fair	Good	Fair	Very Good	Good
Ozone resistance	Excellent	Poor	Poor	Very Good	Very Good	Very Good	Good
Tear resistance	Poor	Fair	Fair	Fair	Fair	Very Good	Very Good
Flammability	Burns (leaves nonconducting ash)	Burns	Burns	Nonflammable	Burns	Nonflammable	Burns
Specific gravity	1.20	1.60	1.40	1.60	1.40	1.35	0.92
ELECTRICAL							
Insulation resistance (K)	5000	20,000	2000	100	75,000	2000	75,000
Dielectric strength (V/Mil)	450	450	450	400	450	750	1000
Power factor	0.0050	0.0400	0.0350	High	0.0100	0.1000	0.00050
Dielectric constant	3.1	3.0	4.2	High	4.0	6.0	2.3
CHEMICAL RESISTANCE							
General	Good	Fair	Fair	Good	Good	Very Good	Very Good
Strong bases	Good	Fair	Fair	Good	Good	Very Good	Very Good
Strong acids	Poor-Fair	Fair	Fair	Good	Very Good	Very Good	Very Good
Oil and gasoline	Poor-Good	Poor	Poor	Good	Fair	Very Good	Very Good
Moisture absorption	Very Good	Fair-Good	Excellent	Fair	Very Good	Very Good	Excellent

Correction: In the first line of figures, top of column, the figures should read "125-200 C."

WIRE and WIRE PRODUCTS

reaches many prospects

YOUR SALESMEN DON'T KNOW!

No matter how big you are, the odds are you don't know all your actual prospective customers. Advertising in Wire and Wire Products will carry your sales story to them.

If your company is small, it is even more important to be "calling" on your prospects and customers regularly through advertising. It pays out handsomely.

Your advertising in Wire and Wire Products will be seen by many people in the plants you wish to "sell" whom your salesmen never would see, yet who specify, actually buy or who influence decisions on products to be purchased. Your advertising is bound to be of immeasurable value to you, too, in paving the way for a good reception for your salesmen when they do call. And the field's buying power is tremendous!

WIRE AND WIRE PRODUCTS circulation, is all paid. We have no agents, offer no premiums or make special inducements to get circulation, except the value of the editorial contents in itself—yet our renewals have averaged 97% or better for many years. That's why it is a good and forceful advertising medium for all concerns who have products to sell to the wire industry.

- **GET YOUR SHARE OF THE BUSINESS . . .**
- **ADVERTISE IN WIRE AND WIRE PRODUCTS . . .**
- **SEND FOR ADVERTISING RATES TODAY . . .**

WIRE and WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

Washington Report

by Larston D. Farrar

The Small Business Administration, now a permanent agency, takes the place, for all practical purposes, of the Reconstruction Finance Corporation, which officially closed out its accounts recently after having served as Uncle Sam's No. 1 money-lending agency to business for many years.

★ ★ ★

The SBA is specializing both in loans to small businessmen, and in technical and management assistance, as personified in its "leaflets" released here with startling regularity. Much of the advice in these leaflets is basic information that anyone who wants to be in business would be expected to know, but a lot of the information helps to bring businessmen up to date on various phases of management.

★ ★ ★

SBA also is supposed to encourage small businessmen by getting "set asides" in orders given out by the various federal departments—that is, demanding that a certain amount of the federal orders be earmarked for awards to small companies.

★ ★ ★

No. 53 in the SBA's series of Technical Aids leaflets is, "Increased Profits from Industrial Air Conditioning," which discloses surveys that have shown increased productivity in air conditioned plants and offices.

★ ★ ★

No. 83 in the SBA's series of Management Aids leaflets is, "More For Your Storeroom Dollar," which discusses three common "profit eaters" found in storerooms. These are (1) disorganized physical layout; (2) uneven distribution of the workload, and (3) poor measurement of the work performed.

★ ★ ★

A new booklet by SBA is entitled, "Ratio Analysis for Small Business," which points out that trouble spots developing in the operation of a small firm often may be corrected before they become serious through proper analysis and comparison of business statistics between one firm and many firms in the same general field. This booklet is available for 25 cents from the U. S. Superintendent of Documents, Government Printing Office, Washington 25, D. C.

★ ★ ★

The leaflets may be obtained at no charge from SBA field offices, or by writing to the agency at Washington 25, D. C.

★ ★ ★

Businessmen expect to increase their outlays for new plant and equipment through the third quarter of this year, in spite of "tight money," and other problems inherent in the present economic situation, according to a just-completed survey made jointly by the U. S. Department of Commerce and the Securities & Exchange Commission.

★ ★ ★

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

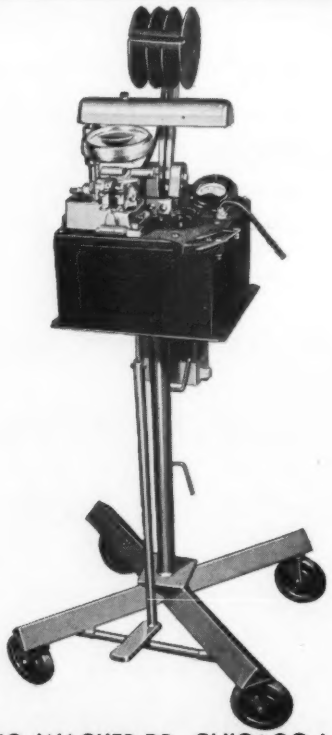
MODEL S.E.M.T. MICRO-WELD BUTT WELDER

This welder was designed and developed expressly for welding all types of fine wire: Aluminum, Copper, Brass, Bronze, Steel and Steel Alloys, ranging in size from .005" to .020" diameter.

Unit design of frame, transformer and power sub-assemblies permit other range of sizes to suit requirements.

Equipped with a temperature indicating annealing and tempering device, voltage regulator and meter to compensate for voltage fluctuation, wire cutters, extra large 5" diameter magnifying glass, fluorescent light and extension cord. Welder can be supplied for bench mounting, or mounted on 4-wheel truck.

The adaptability of this unit for welding all types of wire, either ferrous or non-ferrous, in sizes from .005" to .020" diameter, makes it ideal for the fine wire manufacturer.



MICRO PRODUCTS CO.,

20 NO. WACKER DR., CHICAGO 6, ILL.
Telephone: STATE 2-7468

The capital investment program is expected to hit an annual rate of $37.9 in the third quarter, which will represent a new high for this period in any year in history. Although the current advance is not as great as that experienced in 1955-56, when investment rose sharply following the 1953-54 decline, the modest upward trend at such a high level is an element of strength in the business situation that cannot be overlooked.

★ ★ ★

There is no doubt about cross-currents in the economy. However, judging by capital spending plans, there also seems to be no doubt about high economic activity for some time to come.

★ ★ ★

Private industries, seeking simpler and quicker ways of handling and replying to the mail they receive, may get the answers to many of their problems in a new handbook entitled, "Agency Mail Operations," prepared by the U. S. General Services Administration. It is available for 30 cents from the U. S. Superintendent of Documents, Government Printing Office, Washington 25, D. C.

★ ★ ★

The 47-page handbook contains a set of tested principles that can be tailored to the needs of individual organizations to produce effective, economical service in the movement and control of correspondence.

★ ★ ★

Business Briefs: There now are 22,652,000 living veterans of all wars in the U. S., according to the Veterans' Administration. Population topped 171 million in early June, according to the U. S. Bureau of the Census. Secretary of Labor **James P. Mitchell** has announced here beginning of a new survey of scientific research in industry. There now are 77,869,284 licensed vehicle drivers in the U. S.

Get the habit of reading regularly

WIRE AND WIRE PRODUCTS

The Wire Man's Magazine

CARRIS

OFFERS FAST DELIVERY OF SPOOLS AND REELS!

WE MANUFACTURE TO MEET YOUR REQUIREMENTS

WE DELIVER WITH OUR OWN FORCE OF TRUCKS

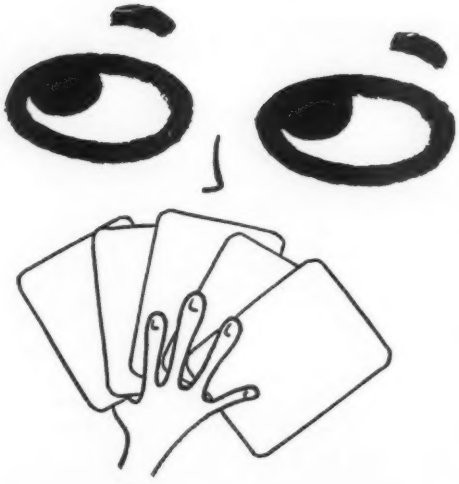
WE MAKE REGULARLY SCHEDULED AND SPECIAL TRIPS THROUGHOUT OUR DELIVERY AREA

For Full Details - CALL PROSPECT 3-7388

CARRIS REELS, INC.

70 PARK STREET RUTLAND, VERMONT

SPECIALISTS IN THE DESIGN AND MANUFACTURE OF PLYWOOD REELS AND SPOOLS



You're welcome to our technical service

Here's a word of advice, just in case you run into a problem in metal selection, fabrication or machining . . . or are faced with unusual service conditions or product requirements. You can get help from Riverside-Alloy's Technical Service Dept. Their wide experience with non-ferrous alloys through the years is at your service. Expert technical service is a Riverside-Alloy extra that stands behind our line of phosphor bronze, nickel silver, cupro-nickel, beryllium copper, stainless steel and nickel alloys. For information on our quality wire, rod and strip for your products, write to Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.

Send today for our free handbooks

ALLOY METAL WIRE
Prospect Park, Pa.

RIVERSIDE METAL
Riverside, N.J.

PRENTISS WIRE MILLS
Holyoke, Mass.

H. K. PORTER COMPANY, INC.
RIVERSIDE-ALLOY METAL DIVISION

These abstracts are published through the courtesy and with the permission of the Industrial Diamond Information Bureau, 34 Holborn Viaduct, London, E.C.1, England. Inquiries regarding them should be directed to the Bureau.

A FERROUS-INCLUSION DETECTOR FOR ALUMINUM ROD

W. Frazer, M. O. Holt. Non-Destruct Testing 1957 Vol 15 (2) pp 96-97 (Mar-Apr)

Ferrous inclusions which may be inconspicuous in ⅜-in. diameter aluminum rods can damage dies when the rod is drawn down to wire. A detector has been developed that gives an audible and visual signal to the operator. 2 illustr.

THE MEASUREMENT OF THE LENGTH OF THE CYLINDRICAL SECTION OF WIRE DRAWING DIES. DAS MESSEN DER LAENGE DER ZYLINDRISCHEN FUEHRUNG AN ZIEHWERKZEUGEN

F. Liekmeier. Drath 1957 Vol 8 (4) pp 121-123 (Apr) (in German)

Owing to the taper of the test needle and the radius of curvature of the blend of conical and cylindrical section of the die, the length of the latter cannot be accurately measured on the finished die. Formulae and a table are given for calculating this length from measurements on (i) the unfinished die, where the conical and cylindrical sections meet at a sharp angle, (ii) after the entrance side has been blended, (iii) after the exit side has been blended as well. 1 illustr, 3 ref, 1 table.

INSTRUMENT FOR TESTING THE STRENGTH OF THIN WIRES, FESTIGKEITSPRUEFGERAET FUER DUENNE DRAEHTE

Karl Frank GmbH, Weinheim/Birkenau. Feingeraetetechnik 1957 Vol 6 (3) p 141 (Mar) (in German)

High precision instrument for testing strength and elongation of thin wires at loads between 0-20g or 0-200g is designed on principle of torsion balance. It not only records the stress-strain curve but automatically averages the critical values of a whole test series. 1 illustr.

BP 767,511. FINE WIRE MESH, ELECTRIC & MUSICAL INDUSTRIES LTD

Abstr Metalworking Prodn 1957 Vol 101 (16) p 697 (Apr 19)

This describes an improved method of manufacturing fine wire meshes particularly for electronic equipment, with reduced liability to wire breakage during the operation. The mesh is made of fine wire having a reinforcing filament, eg of nylon thread, which is removed after weaving.

AN ELECTRICAL ANALOGUE FOR ESTIMATING DIE TEMPERATURES DURING WIRE-DRAWING

A. E. Ranger. Wire Ind 1957 Vol 24 (281) pp 437-439 (May)

Temperature distributions were obtained

experimentally for the outside surface of the die pellet under various drawing conditions and the total heat flux through the die (allowing for a small loss due to convection) was measured. These two sets of measurements permitted temperature distributions throughout the die to be computed with the aid of the analogue network. The special diecase used in the experiments is illustrated. The pellet fits inside the two halves which are located with pins and tapered to fit into a similarly shaped cylinder. The thermocouples were constructed from 40 SWG copper and constantan wires. The analogue network was orthodox, but the mesh was finer in the interface region, where temperature gradients are steepest. Drawing experiments are described. 5 illustr, 6 ref.

INSTRUMENT FOR MEASURING THE DIAMETER OF THIN WIRES

Apparat zum Messen des Durchmessers feiner Draehte

Anon. Feingeraetetechnik 1957 Vol 6 (5) p 236 (May) (In German) 2 illustr.

NEW GRAPHITE LUBRICANT

Joseph Dixon Crucible Co. Ceram Age 1957 Vol 69 (3) p 4 (Mar)

New graphite lubricant developed which does not pick up dirt, dust or chips while in use.

VARIATIONS IN THE SLOPE OF THE CURVES OF PLASTIC DEFORMATION OF METALS

B. Jaoul. C. R. Acad Sci (Paris) 1956 Vol 243 (1) p 16; Brit Soc Rheol Bull 1957 (51) p 13 (3497) (June)

Publishes Study on Business Ratios

A new booklet, "Twenty-Five Years of the 14 Important Ratios" by **Roy A. Foulke,** vice president of **Dun & Bradstreet,** Inc. has just been published.

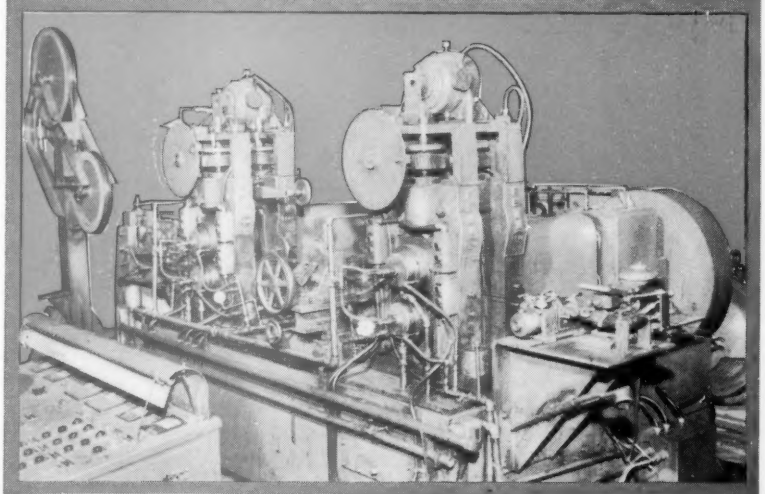
★ ★ ★

This 83 page study, the latest of a series begun in 1931, contains ratios yardsticks which are widely used in the analysis of balance sheets and income statements by the managements of industrial and commercial businesses.

★ ★ ★

Included in the study are updated financial and operating ratios for 78 lines of manufacturing, wholesaling and retailing, which may be of interest to your readers. Single copies are available free of charge and may be obtained by writing to—Public Relations & Advertising Department, Dun & Bradstreet, Inc., 99 Church Street, New York 8, New York.

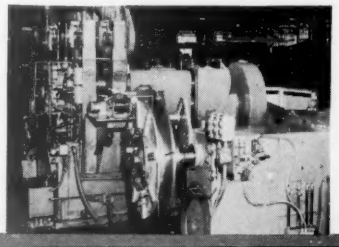
ROLLING WIRE AT 1200 FPM



THIS Fenn Model 082 Tandem Rolling Mill is in operation at the Continental Steel Corporation, Kokomo, Indiana, and is an excellent example of modern, high speed, precision wire flattening. With this mill, Continental reports production speeds of 400 FPM to 1200 FPM. Wire sizes run ranged from 0.5 in. x .130 in. at 1600 lbs., per hour down to .197 in. x .024 in. at 600 lbs., per hour.

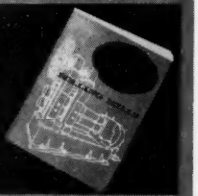
In addition to its precision operation and compactness the Model 082 mill features a one piece bed, automatic loop regulator, power screw-downs, friction-driven edger, electronic gaging, and hydraulically traversing take-up reel.

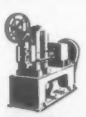
Whatever your requirements for rolling ferrous and nonferrous metals in sheets, strips, wire or rod, it will pay you to investigate the Fenn line of Precision Rolling Mills. Fenn engineering service is available at all times to help you solve any rolling problem.



FENN

SEND FOR NEW FENN ROLLING MILL CATALOG





Precision Rolling Mills

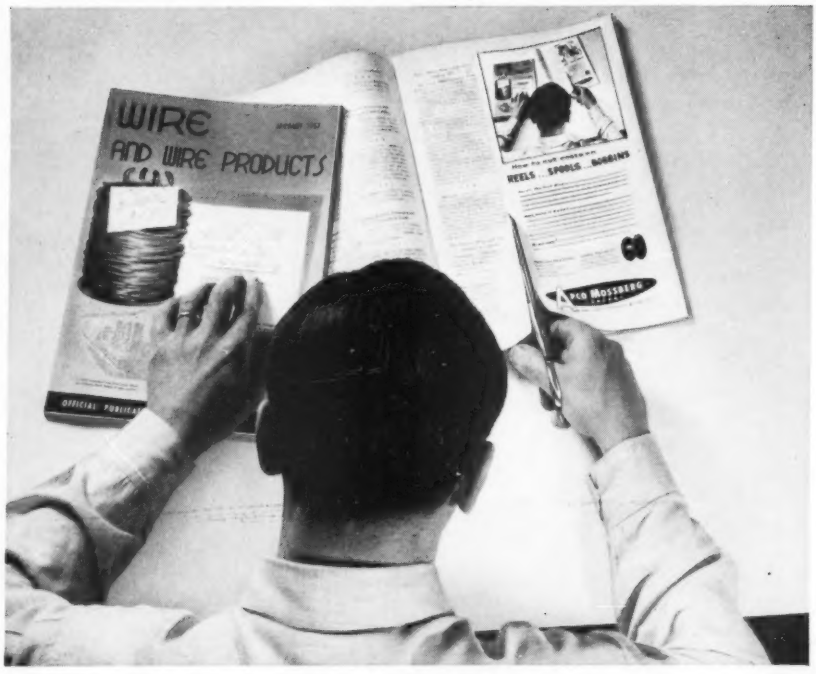
Turks Heads

Wire Shaping Mills

Swaging Machines

Wire and Tube Drawing Machines

THE FENN MANUFACTURING COMPANY, 602 FENN ROAD, NEWINGTON, CONN.



How to cut costs on

REELS...SPOOLS...BOBBINS

Here's the first step! Plan now to set up a handy file on Apco Mossberg Steel Reels, Spools and Bobbins. That way you'll always have a ready reference to one dependable source of supply . . . save yourself hours of time and trouble when looking later on.

Next, make it a point to get all the facts you need to specify the right reels, spools or bobbins to meet your individual requirements. Given the opportunity, Apco Mossberg Engineers can custom design units to meet your exact specifications in size, shape, balance and trueness . . . many times at a substantial saving over the units you are now using.

So act now! Send us your specifications or call collect for preliminary recommendations at no obligation.

Pacific Coast Representative:
Gordon Proffitt
World Trade Center
Ferry Building
San Francisco 11, California

Canadian Representative:
Hugh P. Williams & Co.
47 Colburne Street, West
Toronto, Ontario, Canada

APCO MOSSBERG COMPANY
Lamb Street, Attleboro, Mass.

Handbook of Engineering Tables

A five-hundred page Handbook of Engineering Tables, published by **The American Society of Mechanical Engineers,** 29 W. 39th St., New York 18, N. Y., has been selected as one of the 100 best technical books of 1956, it was announced in April. The book, edited by **Dr. Jesse Huckert,** professor of Mechanical Engineering at Ohio State University, provides a compact source of basic data on metals engineering. It was chosen on the basis of research conducted by **Reginald R. Hawkins,** chief of the science and technology division of the New York Public Library.

★ ★ ★

The foreword of the handbook states that it is designed to provide engineers and others with a ready reference to the properties and characteristics of metals. The bulk of the book comprises engineering tables containing information helpful to designers of gears, threaded devices and other mechanical parts.

★ ★ ★

It was prepared by a group of volunteers, working under the auspices of the Council of The ASME, who collected data from hundreds of sources.

Customer Service is Theme of Pennsalt Meeting

"More and better service for customers," was the theme of the **Pennsalt** Chemicals Metal Processing Products recent sales meeting. Fifty members of the company's field sales staff were given a complete review of modern service methods as they apply to metal processing. Genuine service was described as "the acceptance of responsibility for solving a customer's problems by the organization serving him."

★ ★ ★

Sales Manager **John M. Davidson,** assisted by Chemical Specialties Director of Sales **J. Stanley Hall and** Product Manager **Horace F. McIntyre,** directed a series of panel discussions and sales clinics revolving around the company's line of metal cleaners, phosphate coatings, and cold working lubri-

cants for the metal fabricating and finishing industries.

★ ★ ★

Pennsalt President **William P. Drake** addressed the men on the company's current expansion program and its recent acquisition of Delco Chemical Company, whose manufacutring facilities in Los Angeles and Dallas will serve growing markets in the Southwest.

ASTM and ASA Advisory Committees to NBS Meeting Jointly

The ASTM and ASA Advisory Committees to the National Bureau of Standards met recently at the NBS to review testing activities of the Bureau and to make recommendations as to goals that should be sought in the areas of calibrations, standard samples, test methods, product testing, and related service activities.

★ ★ ★

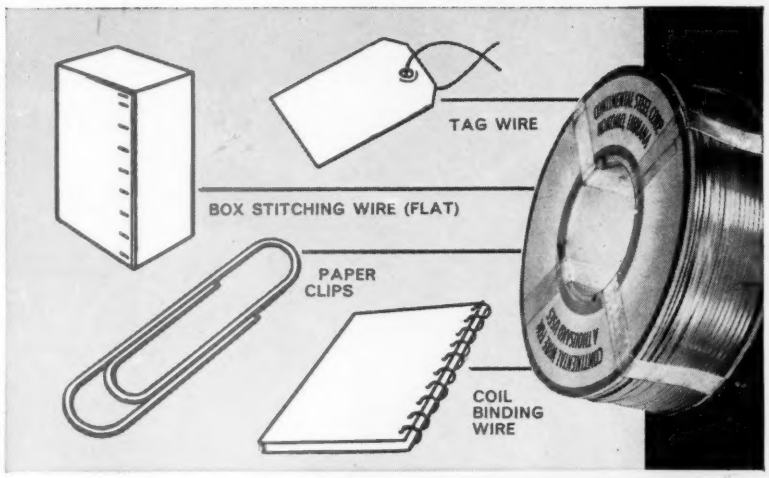
Dr. A. V. Astin, the Director of NBS, stated that broadly the Bureau's objective in these areas is to develop and promote the use of those standards of measurement that are needed by science and industry. He stressed that the Bureau should concentrate its efforts and resources on those services which it is in a unique position to render. For example, the primary aim should be to provide master or reference standards which are themselves used to calibrate other standards or operating instruments. Other laboratories should be encouraged to calibrate their own working and shop standards against the master standards provided by the Bureau.

Weldaloy's Burbank Plant Open

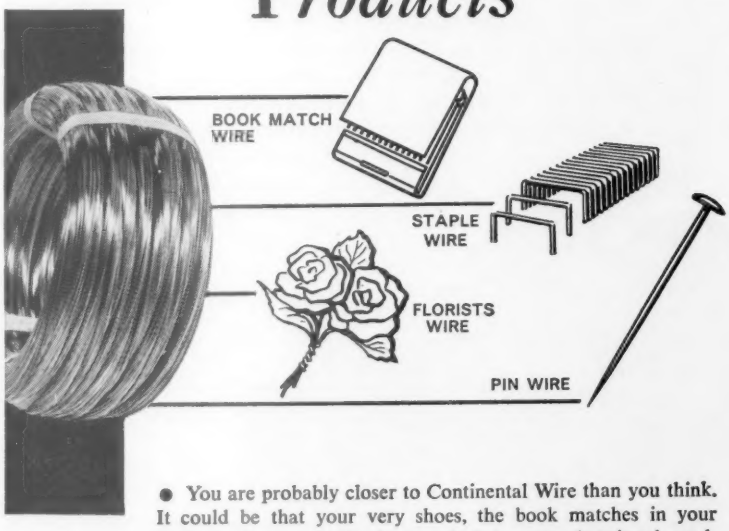
The recent opening of **Weldaloy Products Company's** new facilities at 1209 Chestnut St., Burbank, Calif., has been announced by **J. A. O'Grady,** President.

★ ★ ★

The plant will serve as headquarters for the new Weldaloy Western Division, which will handle all phases of resistance welding, such as: related copper alloys, elec-



Fine and Specialty Wire for Super Fine Products



● You are probably closer to Continental Wire than you think. It could be that your very shoes, the book matches in your pocket or the paper clips in your desk—were made using dependable Continental Fine Wire! That's because Continental is preferred by hundreds of leading firms for literally thousands of different fine wire applications. For super fine products—you, too, should try Continental Fine and Specialty Wire, available in many sizes, of almost any temper, finish or analysis, in low carbon and medium low carbon steels.

For the finest in fine wire—call in Continental!

CONTINENTAL

STEEL CORPORATION • KOKOMO, INDIANA

Wire Specialists for over half a Century

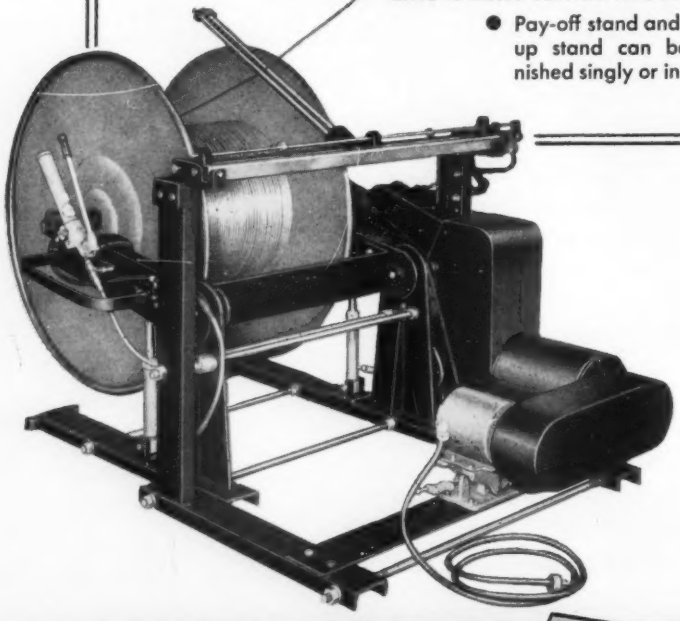
PRODUCERS OF: Manufacturers' Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.

NEW WARDWELLIAN®

PAY-OFF STAND and WINDUP STAND

For Delivering Wire and Cable to Various Types of Production Machines and Winding Product on Reels

- Pay-off stand and windup stand will accommodate reels from 30" to 48" in diameter. Maximum weight of full reel 5000 pounds. Adjustable traverse up to 32" maximum.
- Stands to accommodate reels of greater diameter can be furnished upon request at additional cost.
- Reels raised and lowered hydraulically on both pay-off stand and windup stand.
- Pay-off stand equipped with adjustable friction-control for desired tension of delivery.
- Windup stand equipped with adjustable traverse mechanism.
- Windup stand operated by individual motor through fluid-drive to insure constant rate of draft.
- Pay-off stand and windup stand can be furnished singly or in pairs.



WARDWELL
BRAIDING MACHINE CO.

1212 HIGH STREET
CENTRAL FALLS
RHODE ISLAND, U. S. A.

Representatives for Europe, British Colonies and Dependencies
JAMES MACKIE & SONS, LTD., BELFAST, IRELAND

tronic controls, welding machines and guns, electrode design, tube mill electrodes and general applications of copper alloys to welding for customers in the automotive, aircraft, appliance and tube and pipe fabricating fields.

Experiments Point to Lower Cost Resins

Results of a chemical experiment that may lead to more efficient production of industrial chemicals, such as plastic resins and solvents, were described today before the spring meeting of The American Society of Mechanical Engineers in Birmingham, Ala. The experiment was conducted at the Colorado School of Mines by **R. P. Bopco** and **A. L. Gosman,** now employed as engineers at the Northrup Aircraft Co., Hawthorne, Calif.

★ ★ ★

In a technical paper presented at the meeting the authors indicate that they have been able to cause certain organic vapors to condense on a metal surface in the form of drops instead of as a solid film. According to theory, which has not yet been proved experimentally, condensation in this form should result in much more efficient exchange of heat in chemical production units, thereby making it possible to turn out more products with smaller equipment.

★ ★ ★

Although the authors caution that sufficient information is not yet available to judge the commercial feasibility of their technique, they point out that their experiments definitely demonstrate for the first time that it is possible to condense vapors other than steam in droplet form.

★ ★ ★

Copies of paper No. 57-S-2, can be obtained at 50c each from the Order Dept., ASME, 29 West 39th Street, New York 18, N. Y.

TO SELL—ADVERTISE IN
WIRE AND WIRE PRODUCTS
It pays—send for rates
453 Main St., Stamford, Conn.

New Aluminum Conductor Plant Opened in India

A plant for the manufacture of insulated aluminum cables was formally opened by **K. P. Speedharan Nayar,** Chairman of the Karala Electricity Board, on April 26th in the presence of a large and distinguished gathering. The plant is an addition to the facilities of **Aluminum Industries Ltd.,** Kundara.

★ ★ ★

V. G. G. Nayar, General Manager, had welcomed the gathering

K.P.S. Nayar, Chairman, Kerala Electricity Board speaking at the function. By his side is V.G.G. Nayar, General Manager.

previously and following the dedication, an address was made by **B. V. D. Menon,** Director, who stated that in the last seven years ALIND had produced 75,000 miles of ACSR and all-aluminum conductors.

★ ★ ★

Others who offered felicitations to the company included **Charles G. Gorton,** an eminent English cable engineer, who had assisted in the erection of the plant, and **H. K. Ramaswami,** Chief Engineer of the South Madras Electric Supply Corp. Ltd.

★ ★ ★

The new plant is equipped now to produce from 9 to 15 million feet of insulated wire annually and includes equipment for drawing, stranding, extruding, spark testing, taping, braiding, compounding, impregnating and coiling operations. One of the principal products will be polythene insulated weather-proof cable for house service overhead systems.

For High Tensile Strength, Specify

TEXTILENE GLASCOR*

Soft, dry fillers for portable and flexible cords, Textilene Glascor and Twi-Port have wide acceptance. Fiberglas-centered Glascor is exceptionally strong without added bulk or sacrifice of pliability. It goes into S, SJ, and SV cords with 18, 16, and 14 gauge conductors — Twi-Port into S and SJ cords with 12 gauge and larger conductors. Successful applications include control, appliance, and power cables; telephone drop wire; communications and coaxial cables.

Twitchell's superior Textilene line also includes: Fungus-resistant filler — *Twi-Tar.* Used for buried communications cable, expanded ACSR cable, and in other applications.

Moisture-resistant fillers—*Twi-Flex* and *Twi-Wax.* Used for nonmetallic sheathed cable, maritime shipboard cable, varnished cambric cable.

*Patent Applied For

For Every Wire and Cable Application
Twitchell's TEXTILENE Fillers Fill The Bill

Quality-controlled materials that are dependably uniform . . . in standard forms, or customized to special needs.

Initial low cost with savings added by production efficiency . . . flexible, ready-to-use fillers that fit all equipment, handle and form easily, always maintain desired shape.

Assured supply from a reliable domestic source . . . always available in economical and convenient packaging.

Proved performance as components of cables and wires that meet government specifications . . . stability shown by trouble-free installations in continuous service 20 years and longer.

FREE — SAMPLE SPOOLS of any type of Textilene filler to demonstrate the superiority of Twitchell materials in your operation—also technical counsel without cost or obligation. Just tell Twitchell your end-use requirements. *Write, wire, or phone today:*

E.W. TWITCHELL INC.

Third and Somerset Streets, Philadelphia 33, Pa. • REgent 9-7800

PAPER PRODUCTS FOR THE WIRE INDUSTRY

Twisted • Folded • Pressed • Crushed • Shaped • Braided • Woven

Outstanding Personalities of the Wire Industry

Clem McGowan Retires

Clem L. McGowan, Superintendent of Wire Mills, **Atlantic Steel Company,** Atlanta, Georgia dean of wire mill superintendents, has announced his retirement as of August 1, 1957.

★ ★ ★

Clem will remain in a consulting capacity with the company he has served so long and well—in fact, since 1906. His history goes back of that in the wire industry, however, for at the time of his retirement he literally put in a lifetime of work in the wire industry—63 years of active service.

★ ★ ★

He has been a member and director of The Wire **Association** for many years and in 1956 was elected Honorary Director for life. Mr. McGowan was the Mordica Memorial Lecturer in 1948, at which time he spoke on "54 Years in the Wire Business."

★ ★ ★

In 1951, when the Association held a meeting in Atlanta, Clem

Clem L. McGowan

was host to the wire men who congregated there and, for the period of the convention, had been made Honorary President of Atlantic Steel by the company's directors for the duration of the meeting.

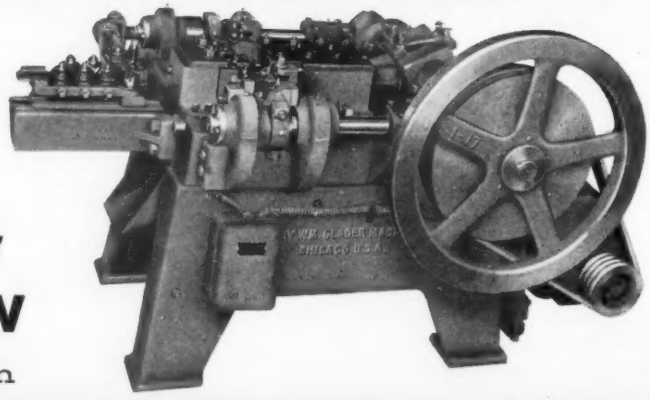
★ ★ ★

He is looking forward to being in Chicago for the 1957 Annual Convention and meanwhile is making his headquarters at his home at 1366 Peachtree Street, N. E., Atlanta, Georgia.

Polglase Made Vice President of Acrometal Products

Fred J. Bieber, president of Acrometal Products, Inc., manufacturer of spools and special machinery for the wire industry, announced the appointment today of **Thomas R. Polglase** as vice president of the company with expanded responsibilities as sales rep-

IF THERE'S A NAIL MACHINE IN YOUR Future make it a GLADER



11 SIZES OF MACHINES

AVAILABLE NOW

Write for 12 Page Bulletin

Wm. GLADER MACHINE WORKS 210 N. RACINE AVENUE CHICAGO 7, ILLINOIS

EXPORT DEPT. 122 EAST 42ND STREET • NEW YORK 17, N. Y.

resentative consulting with top management in midwestern wire mills.

★ ★ ★

Mr. Polglase, a three year member of the Acrometal team, learned the wire business and something about spooling problems from practical experience at the Muskegon plant of **Anaconda Wire and Cable** where he spent twelve years. Starting as head of the Industrial Engineering Department of Anaconda, he advanced to the Technical Department which at that time was responsible for the control of product specifications and manufacturing processes. He was then made head of Purchasing where he spent five years before joining Acrometal Products as midwestern sales representative.

★ ★ ★

While with Anaconda, Polglase had a hand in the design of new equipment for packaging and materials handling—an experience particularly valuable in his present capacty since Acrometal has been active in creating new spooling processes at lower cost as well as improved aluminum and steel spools, and new equipment for handling heavy packages of wire.

★ ★ ★

His territory will continue to be the central United States industrial area where he is well known to the management of mills that produce more than 50% of the wire made annually in the U. S. Since taking over this territory, Acrometal has diversified and expanded its line of products and services and now includes special spooling equipment and special wire machinery.

Thomas R. Polyglase

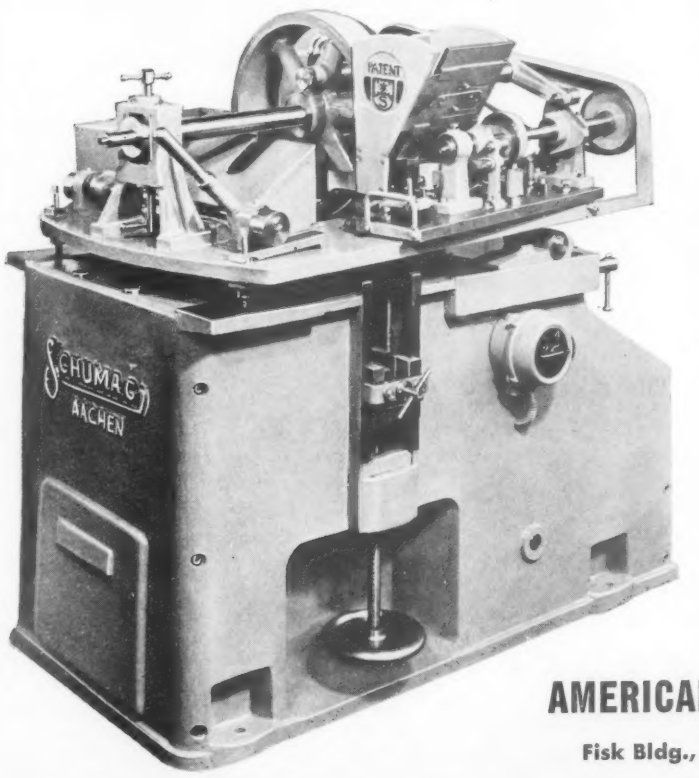
Elgin Abrasives Appoints Representative for Rocky Mountain Region

W. H. Baudouine, Sales Manager of The Abrasives Division of **Elgin National Watch Co.,** has announced the appointment of a new sales representative for its industrial products line in the Rocky Mountain area.

★ ★ ★

Spicer-Lindsay Associates, Denver, Colo., will act as manufacturers agents for the Division, handling sales of diamond compounds, carbide rotary tools, diamond saws and Elgiloy spring materials.

★ ★ ★



SCHUMAG AACHEN

Automatic Pointing Machines

For Mass Production

Rates 6,000 - 70,000 pieces/hr.

These machines are designed for completely automatic, high volume pointing of needles and other small cylindrical parts. Length of points adjustable.

Five models:

Shaft lengths from 1½" to 18"
Diameters from .020" to .390"

Exclusive Representatives
for U.S.A., Canada and Mexico

AMERICAN LAUBSCHER CORPORATION

Fisk Bldg., 250 West 57th St., New York 19, N. Y.

(ILLUSTRATED)
42" x 20" x 21"—(4000# cap.)

HEAVY DUTY
BREAK-DOWN REELS

1000#
2000#
4000#
} capacities

Rugged Design including patented DURA-CURL rim, and many other features necessary to provide the *Strength* and *Durability* needed for continued successful performance.

Also complete line of sizes of Modern High Speed Wire Drawing NO-CREV Spools and Reels for both fine and intermediate size wire.

Telephone
Attleboro 1-0848

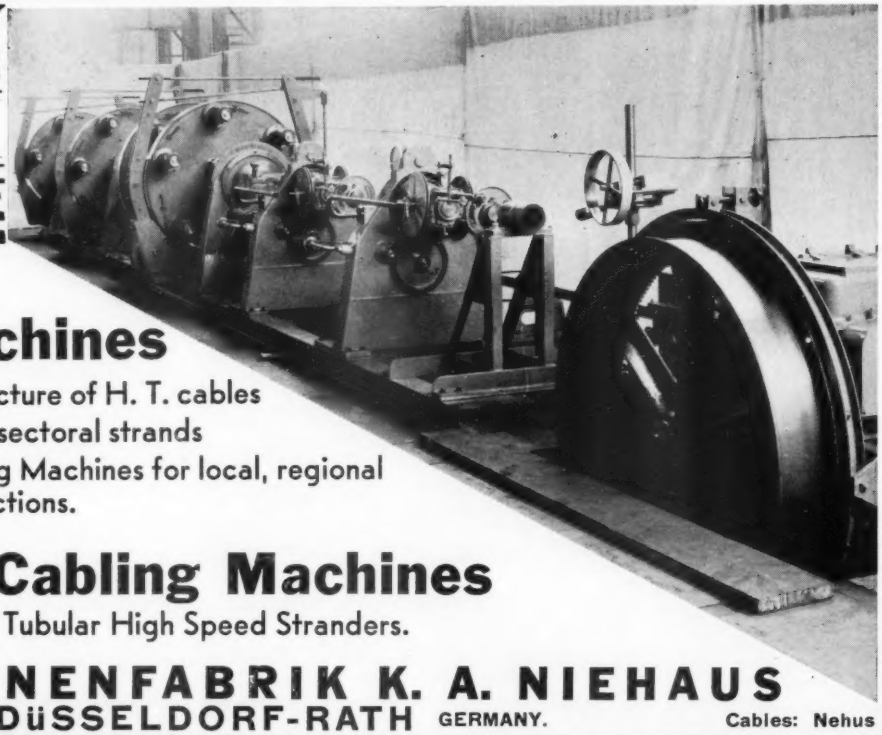
Mossberg PRESSED STEEL Corporation

18 WEST ST., ATTLEBORO, MASS., U.S.A.

James Day (Machy) Ltd.
28 Maddox St.
London W.I. England

#103

NIEHAUS



Cabling Machines

Machines for the manufacture of H. T. cables
Machines for pretwisted sectoral strands
Telephone Strand Cabling Machines for local, regional and long distance connections.

Wire Rope Cabling Machines

Rope Closing Machines. Tubular High Speed Stranders.

MASCHINENFABRIK K. A. NIEHAUS

Phone: Nr. 65551 DÜSSELDORF-RATH GERMANY. Cables: Nehus

5th European Fair of Machine-Tools, Hannover 15-24.9.1957. Hall 8A Stand 8908
Sole Agent U.S.A. & Canada: Paul Reicher, P.O. Box 127, Willowdale, Ont., Canada. Tel.: BA. 1-7455

A four-state area, including Colorado, Utah, Wyoming and New Mexico, will be served out of offices at the Colorado Grange Bldg., 2475 W. 26th St., Denver.

Young to Produce Neg'ator Springs

L. A. Young Spring & Wire Corp. has announced that it has acquired license rights from Eastern Metals Research Co. to manufacture and sell the patented Neg'ator constant-force spring in high volume automotive applications.

★ ★ ★

Thomas Couper, general vice president, said the company will immediately undertake a program to research and test the spring device for use in such automotive parts as car windows, seat tracks, rear deck and hood mechanisms, brakes, throttles and convertible tops.

★ ★ ★

Resembling a simple roll of metal tape, the constant-force spring may be uncoiled to any desired extension or to its maximum length with no increase or decrease in applied force. The full force of the spring is maintained effectively throughout the return stroke.

Stelco Sales Appointment

Lee T. Craig, Vice-President, **The Steel Company of Canada, Limited,** Hamilton, announces the appointment of **Lyle H. Doering** to the post of Assistant General Sales Manager, Finishing Mill Products, with headquarters at the Company's General Offices in Hamilton.

★ ★ ★

Mr. Doering is well known in the hardware and steel industries across Canada, having been associated with these industries for a number of years.

★ ★ ★

At present, he is a Director of the Hamilton Chamber of Commerce; Chairman, Public Relations Committee, Canadian Manufacturers Association and Vice-President, Hamilton-Wentworth Advisory Board and Canadian National Institute for the Blind.

Polymer Chemicals Appoints Eastern Sales Manager

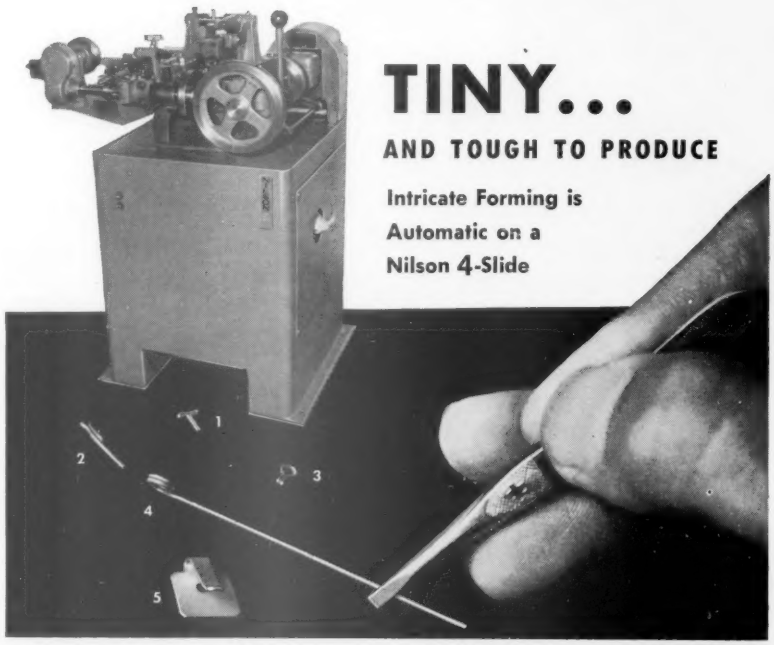
Polymer Chemicals Div., W. R. Grace & Co., has announced the appointment of **John J. Keville** as Sales Manager for its eastern region, with offices in Clifton, N. J. He will direct sales of high-density polyethylene to be marketed under the name Grex.

★ ★ ★

He received his Bachelor's Degree from Columbia University in 1933. He was with the Plastics Division of Celanese for 19 years, where he rose from salesman to Assistant General Sales Manager. In 1955, he became General Manager of the Standard Plastic Products Div., Standard Pyroxoloid Corp.

Macwhyte Appoints Rope Engineers

Ferd Chiappetta, formerly Ass't. Wire Rope Engineer, has been appointed Wire Rope Engineer for **Macwhyte Company,** effective May 1, 1957. He replaces **William C. Russell** who retired on May 1st



Small wire and ribbon metal forms shown here in actual size are typical examples of modern precision production on a Nilson #00 4-Slide. Compact in size, this 4-Slide produces up to 375 pieces per minute in material not exceeding .040 dia. and 3" in blank length. Easily access to tooling, accurate feeding to within .003, and rugged construction assures years of precision forming.

1 **Mercury Switch Part** . . . .014" x .019" platinum wire, formed with tolerances within .001" on over-all length. Production rate, 175 per minute.

2 **Electrical Contact** . . . .0076" x .0030" wide phosphor bronze formed at a production rate of 200 per minute.

3 **Swivel Part** . . . .025" brass wire. Heading operation includes eye formed with tolerances within .008", shank within .003 tolerance. Production rate, 300 per minute.

4 **Leadwire** . . . .026" soft tinned copper wire formed at a rate of 140 per minute with two 7/64" diameter windings.

5 **Contact Part** . . . .010" x 3/8" wide phosphor bronze formed at 175 per minute.

A.H. NILSON MACHINE COMPANY

1516 BRIDGEPORT AVENUE, SHELTON, CONN.

Automatic Chain Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

after 34 years of service with the Company.

★ ★ ★

Mr. Chiappetta will be assisted in his new position by **Fred E. Dykeman,** who has been appointed Fabricated Products Engineer, and by **Vernon J. Young,** who has been appointed Junior Product Engineer.

Made New York District Manager by Chase Brass

G. C. Van Heusden has been promoted by **Chase Brass & Copper Co.,** a subsidiary of **Kennecott Copper Corp.,** to district manager of their new New York warehouse and office, at Maspeth, L. I., according to an announcement by **George B. Moseley,** vice-president, sales. Mr. Van Heusden succeeds **Herbert H. Bartlett,** who retired as of February 1 after 31 years of service with Chase. **Mr. Van Heusden** has been associated with Chase since 1925, virtually all of the time in sales.

Crucible Appoints Assistant Branch Manager

Richard G. Frederick, Manager of the Baltimore Sales Branch of **Crucible Steel Company of America,** has announced the appointment of **Albert J. McConnell** as Assistant Branch Manager.

★ ★ ★

This branch, created in January of this year, is located at 1614 Mercantile Trust Building, Baltimore 2, Md. Mr. McConnell a metallurgical engineer, has been with Crucible since joining the Baltimore office as a sales service engineer in 1949.

Opens Los Angeles Sales Office

J. E. Connell, sales manager of the West Coast Division of the **Nopco Chemical Company,** Richmond, Calif., has announced the opening of a Los Angeles sales office for Nopco's Industrial Chemical Division and the Metasap Chemical Company.

★ ★ ★

Working out of the new office, located at 4858 Valley Boulevard, will be **F. R. Gagnier** and **D. E. Murphy** who will handle the sales of Nopco's many industrial processing chemicals.

WRI Joins Conference of Building Officials

The Wire Reinforcement Institute, trade association of the manufacturers of steel welded wire fabric, has been named a member of the **International Conference of Building Officials.**

★ ★ ★

The Conference, with headquarters in Los Angeles, has developed and promotes the Uniform Building Code adopted by municipalities in over 35 states and by many of the nation's principal cities. Originally formed in 1922 as the Pacific Coast Building Officials Conference, the organization's influence has now spread nearly nation-wide and to Alaska, Canada and Hawaii.

★ ★ ★

As a member of the Conference, the Institute will work to support the objectives of the organization and will aid in interpretation and formulation of code provisions affecting welded wire fabric for reinforced concrete construction.

PLYMKRAFT
CABLE FILLER

Made to Your Most Exacting Specifications

Plymkraft Cable Fillers are made to fit your particular standard of manufacturing. Whether it is treated with wax, jute saturant or anthracene, Plymkraft is made to meet your moisture requirements in cables. Always uniform, made to a fine tolerance, and ready to use, Plymkraft Cable Fillers are ideal for highspeed cablers where extra strength is a must. Plymkraft's fill capacity means savings in a good-looking cable.

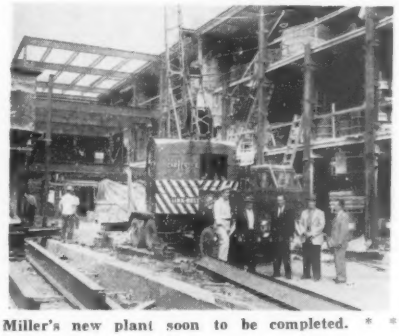
To keep up to date with cable filler developments, it takes only an inquiry for samples of Plymkraft. To find the quality cable filler best suited for your wire needs, write today to:

PLYMOUTH CORDAGE COMPANY
Plymouth, Massachusetts • New Orleans, Louisiana
Warwick, Virginia

Frank B. Brown is Managing Director of WRI, with headquarters in Washington. Its membership accounts for over 95 percent of all welded wire fabric production in the United States.

R. H. Miller Expansion Program Nearing Completion

The R. H. Miller Co., Inc., of Homer, New York, known the world over for its "Steelskin"



Miller's new plant soon to be completed. * *

Metal Working Lubricants, is now in its second year of a three year remodeling and construction program.

★ ★ ★

Within a few months, a new 12,000 square foot addition to the three story building erected in 1956 will be completed, thereby greatly increasing the company's manufacturing, warehousing and shipping facilities.

★ ★ ★

Pictured above are, left to right, **William Breidinger,** Production Superintendent, **William Marshall,** of Marshall and Haley Contractors, **Walter A. Smigel,** General Manager of the R. H. Miller Company, and **Richard Day,** Executive Director of the Cortland County Chamber of Commerce.

G.E. Appoints West Coast Manager for Chemical Materials Division

Appointment of **J. L. Galt** as West Coast marketing manager for **General Electric's** chemical materials department has been announced by **J. R. Patterson,** manager of the department's West Coast operation.

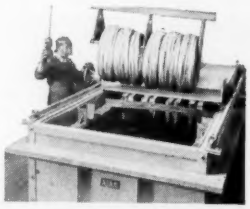
★ ★ ★

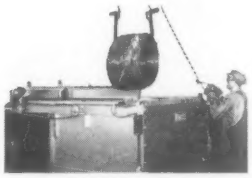
G.E.'s chemical materials department serves western markets with Glyptal (R) alkyd resins for the paint industry and polyester resins for reinforced plastics, from manufacturing facilities at Anaheim, Calif.

★ ★ ★

Mr. Galt, formerly manager of the Company's phenolic products plant at Pittsfield, Mass., is located at the department's Los Angeles office, 1052 West Sixth Street. A graduate of the University of Texas with both bachelor and master of science degrees in chemical engineering, he joined G.E. in 1947 as a process development engineer. After serving as supervisor of manufacturing engineering at the phenolic products plant, he was named plant manager at Anaheim in 1952.

TYPICAL — The Ajax installation at right treats 1000 lbs. of aluminum alloy wire an hour. It is also used for annealing brass and copper wire and for stress relieving cold headed C1008 ½" steel rods. (Lower left) 700 lb. charges of steel wire are brought to annealing temperature in less than 15 minutes, clean, scale-free and without decarburization.





faster
more uniform
heat processing
AT LOWEST EQUIPMENT COST

AJAX
HULTGREN
electric SALT BATH furnaces

Heating cycles are a matter of minutes . . . NOT hours. Bigger charges are handled far faster . . . in less floor space . . . in electric salt baths that cost about half the price of atmosphere furnace equipment of equal capacity. Molten salt seals out all air, preserves wire surfaces, guards against scale and decarb. Wire quality and uniformity are improved . . . because no other method matches Ajax Salt Baths for heating uniformity. Ideal for low- and high-carbon steels, stainless, aluminum, copper alloys and silver alloys.

WRITE FOR case history bulletins on ☐ Process Annealing; ☐ Descaling; ☐ Patenting; or ☐ Cleaning, Preheating or Fluxing. These describe actual Ajax salt bath installations and actual wire processing results obtained.

AJAX ELECTRIC COMPANY
928 FRANKFORD AVENUE., PHILADELPHIA 23, PA.

Associates: Ajax Engineering Corporation • Ajax Electrothermic Corporation

A Review of Recent Wire Patents

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of this magazine and remitting 50c for each copy desired. For orders received from outside the United States the cost will be $1.00 per copy.

No. 2,796,974, ARTICLE TRANSFER MECHANISM, patented June 25, 1957 by Karl Weinberger, Dusseldorf-Neuss, Germany, assignor to Schloemann Aktiengesellschaft, Dusseldorf, Germany.

More specifically this invention relates to improvements to an installation, including hooks, for automatically lifting wire coils from a chain conveyor of the type having spaced parallel chains.

★ ★ ★

No. 2,797,694, HAIRPIN, patented July 2, 1957 by William Williams, Wilkes-Barre, Pa.

This is a bobby-type hairpin formed from a single length of flat resilient wire, bent to shape.

★ ★ ★

No. 2,797,799, APPARATUS FOR DRAWING WIRE AND OPERATING THEREON, patented July 2, 1957 by William A. Ehlert, South Euclid, Ohio, assignor to The Ajax Manufacturing Company, Cleveland, Ohio, a corporation of Ohio.

A drawer-header combination is provided in which multiple feedings of the drawn wire are accomplished by the use of a multiple lobe cam.

★ ★ ★

No. 2,798,233, SPRING MATTRESSES, CUSHIONS, SEATS AND SIMILAR ARTICLES, patented July 9, 1957 by Paulo R. Robell, Sao Paulo, Brazil, assignor to No-Sag Spring Company, Warren Township, Macomb County, Mich., a corporation of Michigan.

A reinforcing element for the border edges of a mattress, cushion and the like having resilient load supporting wire springs therein is disclosed, including a pair of V-shaped sinuous wire spring strips.

★ ★ ★

No. 2,799,219, LIDDER FOR WIRE BOUND BOXES, patented July 16, 1957 by Ernest A. Verrinder, Riverside, Calif., assignor to Food Machinery and Chemical Corporation, San Jose, Calif., a corporation of Delaware.

There are forty-two claims to this apparatus for applying and fastening lids to wire-bound boxes.

★ ★ ★

No. 2,799,335, SEVERING DEVICE FOR WIRE AND THE LIKE, patented July 16, 1957 by Wilfred Kirby, London, England, assignor to Vickersarmstrongs (Engineers) Limited, London, England, a British Company.

The device comprises an anvil block and anvil, with the latter having a hole therethrough from a rear to a front operative face for the passage of wire to be severed, a spring-influenced cutter carrier pivoted on the block and having a part overhanging the anvil, an inverted cup-shaped cutter attached to the overhanging carrier part over the anvil and a depresser for depressing the carrier against its spring influence to cause the cutting edge of the cutter to rub over the portion of the operative anvil face through which the hole extends.

★ ★ ★

No. 2,799,608, ELECTRIC CABLES, patented July 16, 1957 by Thomas Robertson Scott, London. England, assignor to International Standard Electric Corporation, New York, N. Y., a corporation of Delaware.

More specifically, the invention relates to a process for sheathing with aluminum of at least 99.5% purity a heat sensitive insulated electric wire cable core.

★ ★ ★

No. 2,799,961, BIRD DECOYS, patented July 23, 1957 by Albert L. Jaumotte, Choteau, Mont.

NORBIDE* Abrasive Grain...

Ready to cut Your Refinishing Costs!

Wire men who have switched from costly diamond dust to NORBIDE Abrasive for refinishing dies are amazed at the savings. They have found NORBIDE Abrasive — the hardest manufactured abrasive commercially available—ideal for ripping and semi-finishing operations. Whatever your requirements, we can supply you promptly from stock.

For details and prices on this cost-cutting abrasive, write for form 559, NORTON COMPANY, 45 New Bond St., Worcester 6, Mass.

NORTON®
BORON CARBIDE
Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories.
BEHR-MANNING PRODUCTS: Coated Abrasives Sharpening Stones • Behr-cat Tapes
*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

NORBIDE* | *The hardest manufactured abrasive commercially available!*

Braces for the canvas covering for this hollow decoy are composed of wire. There are twelve claims.

★ ★ ★

No. 2,800,151, MECHANISM FOR MAKING WIRE REINFORCED FABRIC SPRING LINERS OR THE LIKE, patented July 23, 1957 by Newton E. Shockey, Detroit and Howard Wendall Wilkins, Centerline, Mich., assignors to V. D. L. Corporation, a corporation of Michigan.

Primarily, the invention relates to wire feed mechanism for machines for fashioning wire reinforced fabric spring liners, etc. There are eleven claims.

★ ★ ★

No. 2,800,158, MACHINE FOR CRIMPING THE ARMS OF AN ELECTRICAL TERMINAL ABOUT AN ELECTRICAL CONDUCTOR, patented July 23, 1957 by Rene Martines, Warwick, R. I.

It is stated that the operator of this machine may accurately position and advance the wire conductor in proper relation to the arms of the terminal and crimp the arms.

★ ★ ★

No. 2,800,166, SOFA BACK CONSTRUCTION, patented July 23, 1957 by William F. Richardson, assignor to Flex-O-Lators, Inc., Carthage, Mo., a corporation of Missouri.

The construction includes parallel rows of sinuous wire springs secured at an end of each to an anchor rod to which are connected cranks to prevent longitudinal movement of the rod.

★ ★ ★

No. 2,800,167, SPRING STRIP HAVING SOFT EDGE EXTENDING END, patented July 23, 1957 by Edward J. Winkler, Detroit, Mich., assignor to No-Sag Spring Company, Warren Township, Macomb County, Mich., a corporation of Michigan.

A spring made of wire is provided and bent back and forth in sinuous form having a load supporting portion of substantial length set on an arc of small radius and having a V-shaped portion reversely bent from one end of the load supporting portion and disposed on the outer side thereof, the V-shaped portion having one branch disposed adjacent the load supporting portion and a second branch extending outwardly therefrom with the branches arched toward each other.

★ ★ ★

No. 2,800,261, TELESCOPICALLY ADJUSTABLE GARMENT HANGER, patented July 23, 1957 by Wing Wah Lee, San Francisco, Calif.

This hanger is constructed wholly of two lengths of wire joined together and providing a reinforcing of the hanger at the hook portion thereof.

★ ★ ★

No. 2,800,524, ELECTRIC CABLE, patented July 23, 1957 by Glenwood M. Van Lear, Alexandria, Va.

A heat-resistant cable is provided including a number of conductors each consisting of a number of wire strands, and a pasty filling between the insulation of the conductors and the covering of the cable, the filling consisting of at least about fifty percent of asbestos roving, about thirty percent of asbestine and silica flour, and the remainder a minimum of a binder for the asbestine and silica flour to make a paste.

★ ★ ★

No. 2,800,668, NAIL EJECTOR MEANS IN A NAIL MAKING MACHINE, patented July 30, 1957 by John H. Friedman, Tiffin, Ohio, assignor to The National Machinery Company, Tiffin, Ohio, a corporation of Ohio.

The machine includes a spring pressed plunger and a header slide, which plunger is adapted to bear against a headed nail prior to being cut from the stock whereby as soon as a headed nail is severed from the stock the plunger projects the cut nail downwardly and the plunger assembly is thereafter rocked upwardly out of the path of the header slide.

★ ★ ★

No. 2,800,669, PIVOTALLY OPERATED CUTTERS IN A NAIL-MAKING MACHINE, patented July 30, 1957 by John H. Friedman, Tiffin, Ohio, assignor to The National Machinery Company, Tiffin, Ohio, a corporation of Ohio.

The cutters are link-operated and dis-

Standardize on ACROPAK* Spools!

Only ½ the Weight!

YET STRONG, TOUGH, RIGID . . LONGER LIFE

ACROPAK Spools will help you cut wire packaging costs because they give longer service, require less maintenance and cost less to ship. They're strong. They'll take repeated shippings and still run true on the arbor. They're machined to close tolerances. You can run them at high production speeds with fewer snags, less toe-out and minimum end breakage.

Light Weight
Precision built
Reduced cost
Longer life
Extra strength
Dynamic balance
Greater production
Low cost reconditioning
Less maintenance
Attractive packaging

THEY CUT YOUR SPOOLING COSTS

Best proof of ACROPAK superior performance are the millions of these spools now used by the biggest names in the wire industry. We've proved it to them—let us prove it to YOU.

★ We also make a complete line of heavy-duty shop processing STEEL SPOOLS built to the same high standards of accuracy and rigidity as the famous Acropak aluminum spools.

ACROMETAL PRODUCTS INC.
616 5th Street North, Minneapolis 1, Minn.

posed longitudinally alongside the cutter slide of the machine to operate as the slide reciprocates.

★ ★ ★

No. 2,800,670, TAP AND DIE HOLDER, patented July 30, 1957 by Max Fogiel, New York, N. Y.

A tap and die holder is disclosed, including a first frame member containing notches to selectively seat and support part of either a circular edged die, square edged die, V-edged die, or bevel edged die and a second frame member containing notches to cooperate with the first frame member in the seating and supporting of the dies. The holder is manually turned by levers.

★ ★ ★

No. 2,800,928, APPARATUS FOR FORMING SPRINGS, patented July 30, 1957 by Harry H. Norman, Los Angeles, Calif., assignor to Zig Zag Spring Company, a partnership, Los Angeles, Calif.

A wire bending machine is disclosed including a pair of oppositely rotating drums and bending heads mounted on the drums with a driving connection between some bending heads and a stationary gear and a driving connection between other bending heads, and a rotary gear whereby some bending heads may be rotated in one direction by the stationary gear and others may be rotated in the opposite direction by the rotary gear.

★ ★ ★

No. 2,800,997, NAIL MACHINE, patented July 30, 1957 by John H. Friedman, Tiffin, Ohio, assignor to The National Machinery Company, Tiffin, Ohio, a corporation of Ohio.

More specifically, a safety stop device is provided for a nail machine of the type having feeding means to intermittently advance wire stock into the machine.

Cable Filler Samples Available

A systematic sampling program has been instituted by the Industrial Yarns Division of **E. W. Twitchell, Inc.,** Philadelphia, for actual-production tests to compare its 'Textilene' fillers for wires and cables with other materials.

★ ★ ★

Sample spools of all the fillers in the Twitchell line have been prepared to provide adequate working samples. The many available types include 'Twi-Flex' and 'Twi-Wax' for moisture resistance, 'Twi-Tar' for fungus resistance, and Fiberglas-centered 'Glascor' for high tensile strength without added bulk.

★ ★ ★

'Textilene' fillers are easily-formed materials that retain their shape. Cables and wires made with them meet government specifications. It may be also noted that their stability has been demonstrated by trouble-free installations in continuous service for periods as long as 20 years.

★ ★ ★

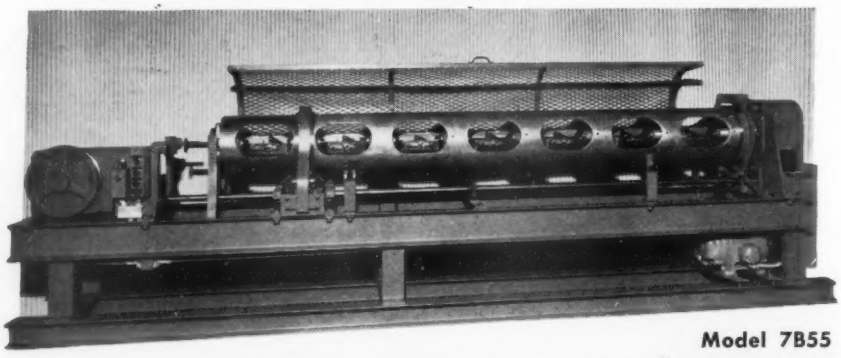
Appropriate spools for the performance tests are being supplied to wire and cable manufacturers specifying their end-use requirements. The applications include control, power, appliance, communications and coaxial cables; maritime shipboard, varnished cambric and underground service entrance cable; non-metallic sheathed cable (building wire); expanded ACSR cable; buried communication cable (bedding and overall serving); and many others.

★ ★ ★

Sample spool requests and technical-assistance inquiries may be directed to **E. W. Twitchell, Inc.,** Third and Somerset Sts., Philadelphia 33, Penna.

SEVEN BAY HI-SPEED STRANDER

Stranders also available with 6, 7, 12 or 18 bay construction



Model 7B55

DESIGNED AND MANUFACTURED FOR ARMY SIGNAL CORPS WD-1/TT FIELD WIRE EQUIPMENT PROGRAM

Introduced in 1951 and has received wide acceptance . . . users report SUPERIOR performance. A departure from 50 years of steel barrel construction . . . utilizes the latest high strength aluminum alloy barrel . . . eliminates useless weight, increases speed, and reduces operating costs.

For complete information write to . . .

BARTELL

BARTELL MACHINE-TOOL CORP.

ROME, NEW YORK

Serving the Wire Industry Since 1940

Announces New Lubricant

A new, "miracle" lubricant, the greatest advance in the history of open gear lubrication ever made, has just been announced by the **Warren Refining & Chemical Co.,** Cleveland, Ohio. Only 25% of the new lubricant, called Plastigear-X, is required as compared to even the toughest greases previously used.

★ ★ ★

Plastigear-X presents a tremendous advantage over old-style lubricants because it cannot melt or freeze, and is not susceptible to water or extreme pressure. At high temperatures it can be successfully used where other open gear lubricants will melt and drip off.

★ ★ ★

It can be applied either by hand or gun and is recommended for all types of open gears, exposed or enclosed chain, wire rope or cable. Its use in road machinery, manufacturing plants and all other places requiring open-geared equipment is unlimited.

New Clamps for Aluminum Cable

Smoother, quicker cable installation, without the usual fumbling for loose parts, is made possible by a new line of clamps introduced by **Aluminum Company of America.**

★ ★ ★

The clamps, known as 480 Series, can be applied without being disassembled. Nuts have been eliminated, enabling linemen to make installations without loose-part interruptions. An additional timesaver is a newly-developed universal parallel groove design, making it possible for three clamps to cover the full range from #2 to 397.5 MCM in ACSR, and from #2 to 400 MCM in stranded aluminum conductor.

Booklet on High Temperature Alloys

The engineering properties and fabrication characteristics of ten high-strength alloys for elevated temperature service are described in detail in a new 20-page booklet just issued by **The Carpenter Steel Co.,** Reading, Pa. The technical information includes physical constants, mechanical properties at room and elevated temperatures, heat treatment, forging, cold working, welding and corrosion resistance. Recommended uses are spelled out for each alloy with a comprehensive discussion of how to use stress-rupture and creep data in designing components for high temperature service. The effect of steelmaking practice on forgeability, cold working properties and service behavior is also described.

★ ★ ★

Inquiry for a copy should be directed to The Carpenter Steel Company, 3050 West Bern St., Reading, Pa.

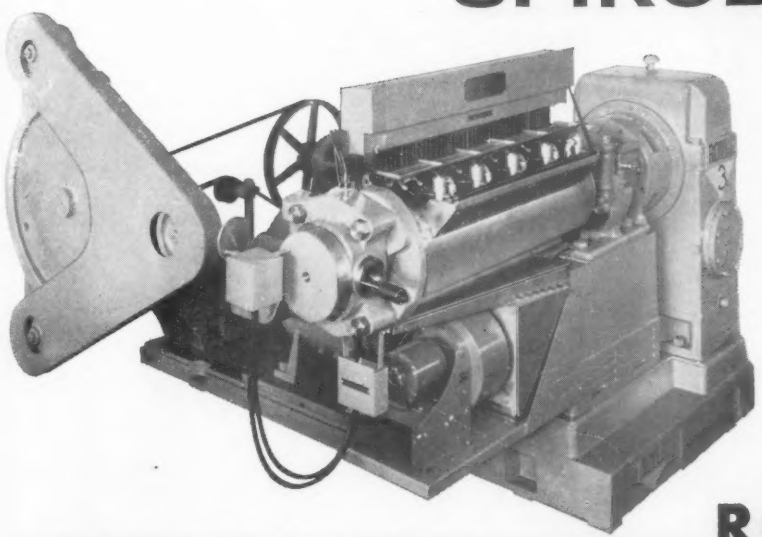
Milford Rivet Completes Expansion of Aurora Plant

An addition of over 10,000 sq. ft. of manufacturing space, complete with some of the most modern high-capacity cold-heading equipment in the midwest, has been put into operation at the Aurora, Ill., facilities of **Milford Rivet & Machine Co., V. L. Bradford,** Execu-

ROYLE

SPIROD®

for Rubber or Plastic Wire Insulating



These all electric extruders with radiant heat and high velocity evaporative cooling are designed to process either plastic or rubber compounds. The result of more than three quarters of a century of experience — Royle pioneered the extrusion process in 1880— in the design and construction of extruding machines time tested features have been built into Spirod to assure dependability.

Write for Bulletin #463

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

London, England — James Day (Machinery) Ltd. — Hyde Park 2430 - 0456

Home Office — V. M. Hovey J. W. VanRiper — SHerwood 2-8262

Akron, Ohio — J. C. Clinefelter — BLackstone 3-9222

Los Angeles, Cal. — H. M. Royal, Inc. — LUdlow 9-3261

Tokyo, Japan — Okura Trading Co., Ltd. — (56) 2130 - 2149

tive Vice-President has announced.

★ ★ ★

This increase in plant capacity, which has been accompanied by the installation of larger production equipment as well as new machining, washing, finishing and inspection facilities, was necessitated by expanding markets for rivets and cold-headed specialties in the midwestern and southern states, which this plant services. In the past 15 years, Milford River has added substantial manufacturing capacity at plants in Elyria, Ohio, and Milford, Conn., besides building new plants at Norwalk, Calif. and Hatsboro, Pa.

Paper Tells How Catalytic Purifier Removes Dangerous Fumes From Exhausts

Removal of carbon monoxide and other air contaminants from exhausts of LP-gas-powered trucks by catalytic purifiers is described in a paper, "Sweetening the Fork Truck's Breath," reprinted by **Oxy-Catalyst, Inc.,** Wayne, Pa.

★ ★ ★

The paper discusses the growing problem of atmosphere contamination resulting from industrialization and tells how Oxy-Catalyst was founded to apply oxidation catalysts in devices to eliminate or reduce the contamination. Among these products are Oxycats which control pollutants from industrial processes, catalyst-coated wire coils to eliminate the odors from electric ranges, and catalytic purifiers for use with engines powered with Diesel oil, leaded gasoline, unleaded gasoline and LP-gas.

★ ★ ★

Copies of the reprint, are available free on request to Oxy-Catalyst, Inc, Wayne, Pa.

Escambia Chemical Constructing Research Center for Plastics Industry

Construction of a Research Center at Wilton, Conn., by **Escambia Chemical Corp.** is now underway, according to **Dr. Nat C. Robertson,** Vice President and Director of Research, who will be in charge of it.

★ ★ ★

This new Center, a 50,000 square foot building on a 46-acre site, will provide for research and development activities and customer and technical service laboratories of Escambia. Its work will include research activities in petrochemicals, the plastics industry and in related fields.

Transfers Norelco Office to Philadelphia

A new Norelco office has been opened at 1825 Grant Avenue, Philadelphia, by the Instruments Division, **Philips Electronics, Inc.,** 750 South Fulton Avenue, Mount Vernon, N. Y., according to an announcement by **C. J. Woods,** national sales manager.

★ ★ ★

The Philadelphia office replaces that formerly located in Newark and will serve Norelco customers in the New Jersey and eastern Pennsylvania area. **Frank Cava-**

GREATER FLEXIBILITY IN WIRE STRAIGHTENING AND CUTTING WITH VARIABLE SPEED DRIVE

. . . in a low cost machine

- Select-O-Speed Drive permits selection of infinitely variable feed speeds from 25 to 155 FPM for all types of wire and rod.
- Available with super-sensitive electric trip mechanism.
- High-Speed Five-Die Straightener Arbor, mounted on ball bearings.
- Lewis engineered, simple, rigid, dependable . . . of best materials and workmanship.
- Ideal for manufacturers of stove and refrigerator racks, lamp shades, wire baskets, garment hangers, welding rod and other products where small diameter wire is used.

Lewis 1-C Automatic Wire Straightening and Cutting Machine. 1/16" to 1/8" capacity.

For further information write:

THE LEWIS MACHINE COMPANY

3441 EAST 76TH STREET • CLEVELAND 27, OHIO

nagh is sales engineer in charge of the Philadelphia office.

C. F. & I. Catalogs on Slings

Three new folders describing suggested applications and ordering specifications for wire rope slings have been made available by the **Wickwire Spencer Steel Division** of **The Colorado Fuel and Iron Corp.** These describe Wickwire's Uniflex, Multiflex and Maxiflex wire rope slings.

★ ★ ★

Uniflex slings are specially designed for applications where abrasion is an important factor. As the name implies, the body of each leg of a Wickwire Uniflex sling is a single piece of wire rope. Due to the relatively large size of the rope's outer wires, this sling can withstand severe abrasion.

★ ★ ★

Multiflex slings, made from six part flat braids, are designed for maximum load-bearing surface area and ultimate flexibility in one direction.

★ ★ ★

Maxiflex slings provide superior flexibility in all directions. Each leg of a Maxiflex sling is made up of eight identical wire ropes braided together to form a round braid. This is the most universally used of all the braids.

★ ★ ★

Copies are available from the Advertising Dept., The Colorado Fuel and Iron Corp., 575 Madison Ave., New York 22, N. Y., or from any of the company's regional sales offices.

J&L Builds Experimental Highway

An experimental 600-foot stretch of highway that may have a revolutionary effect on present methods of highway construction has been built by **Jones & Laughlin Steel Corporation.**

★ ★ ★

The project represents one of the first full-scale efforts on the part of private industry to find a solution to the nation's highway construction problem. The experiment is timely in view of the Federal Government's new $37 billion highway construction program.

★ ★ ★

The experimental roadway is of pre-stressed concrete design. The pre-stressing operation was done in February. Extensive tests on the roadway will be carried out in the coming months.

★ ★ ★

The advantages of pre-stressed concrete have been known for some time. Numerous bridges and other structures have been built of pre-stressed concrete. One of the most recent was the 24-mile bridge across Lake Pontchartrain in Louisiana.

★ ★ ★

Essentially, the J&L experiment consists of anchoring connecting wire strands at opposite ends of a 400-foot section of roadway to be formed. The strands pass through

(*Please turn to page* 1041)

Electronic Sensing Switch

This switch is an electronic piece of equipment capable of triggering the electric cut-off mechanism of all clutch type coilers.

A coiler equipped with the electric cut-off and the WINSTROM ELECTRONIC SENSING SWITCH can now hold free length dimensions to previously impossible accuracies.

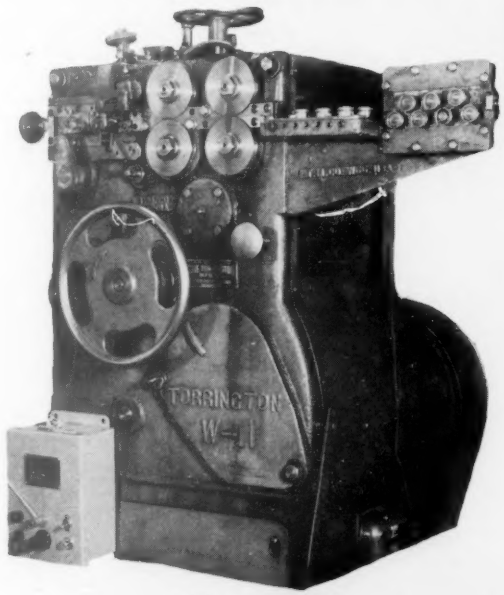
OTHER APPLICATIONS INCLUDE:

- **Liquid Level Control**
- **Drop Wire Detection**
- **Insulation Testing**
- **Safety Alarms**
- **Automation**
- **Human Touch Control of Electric Devices**
- **Switching Amplification**

WINSTROM

P.O. BOX 452 NORTHAMPTON, MASS.
Tel.: JU 4-0829

Model ESS-2

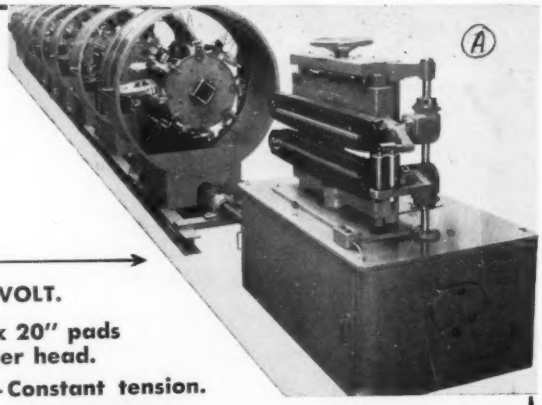


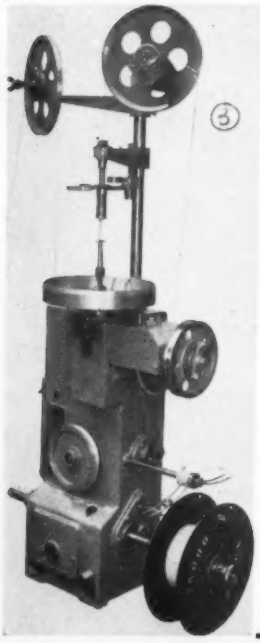
SEND FOR BULLETIN ESS-2

Custom Engineered Electro Mechanical Devices

NEW...

IN PAPER LAPPING





FOR TELEPHONE

— High speed paper lapping.
— 3,000 r.p.m.
— Movable drum.
— Automatic stop.
— 12" pad.
— Electric counter.
— Central lubrication.

FOR HI. VOLT.

— 8 x 20" pads per head.
— Constant tension.
— Extensible pad centre.
— Individually braked.
— Variable die.
— Caterpillar haul-off.
— P.I.V. drive.
— Automatic stop.

POURTIER MACHINES

153, rue Général Gallieni

ROMAINVILLE (Seine) FRANCE

AMERICAN IRON AND STEEL INSTITUTE
150 EAST FORTY-SECOND STREET, NEW YORK 17, N. Y.

AIS 10

Total Number of Companies Included 127

JUNE - 1957
Month

SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING CARBON, ALLOY AND STAINLESS
(Net Tons)

Covering Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or for Resale)

Steel Products	Items	CURRENT MONTH 1957 Carbon	Alloy	Stainless	Total	Percent of Total Shipments	Prior Year (1956) Percent of Total Shipments	YEAR TO DATE * 1957 Carbon	Alloy	Stainless	Total	Percent of Total Shipments	Prior Year (1956) Percent of Total Shipments
Ingots and Steel Castings	1A	17,976	15,661	2,728	36,365	0.5	0.7	141,596	104,898	13,515	260,009	0.6	0.9
Blooms, slabs, billets, sheet bars	1B	301,942	36,869	1,849	340,660	4.7	2.7	1,228,341	252,524	12,591	1,493,456	3.4	2.8
Tube rounds	1C	6,891	263	-	7,154	0.1	0.1	44,870	2,014	2	46,886	0.1	-
Skelp	2	9,159	-	-	9,159	0.1	0.3	87,944	-	-	87,944	0.2	0.2
Wire rods	3	96,491	1,023	632	98,146	1.3	1.4	522,219	9,747	3,010	534,976	1.2	1.4
TOTAL SEMI-FINISHED		432,459	53,816	5,209	491,484	6.7	5.2	2,024,970	369,183	29,118	2,423,271	5.5	5.3
Bars—Hot rolled (incl. light shapes)	14	551,232	132,260	5,358	688,850	9.5	10.2	3,498,139	813,008	33,494	4,344,641	9.8	10.6
Bars—Reinforcing	15	232,738	7	-	232,745	3.2	3.4	1,333,963	336	-	1,334,299	3.0	2.8
Bars—Cold finished	16	93,417	17,570	5,362	116,349	1.6	2.1	590,794	122,323	34,117	747,234	1.7	2.2
Tool steel	17	1,085	6,904	-	7,989	0.1	0.2	7,262	48,821	-	56,083	0.1	0.2
TOTAL BARS AND TOOL STEEL		878,472	156,741	10,720	1,045,933	14.4	15.9	5,430,158	984,488	67,611	6,482,257	14.6	15.8
Wire—Drawn	23	273,681	3,889	2,754	280,324	3.9	4.1	1,408,110	24,926	15,527	1,448,563	3.2	3.7
Wire—Nails & staples	24	59,216	-	1	59,217	0.8	0.9	260,659	-	3	260,662	0.6	0.7
Wire—Barbed & twisted	25	8,759	-	-	8,759	0.1	0.1	43,183	-	1	43,184	0.1	0.1
Wire—Woven wire fence	26	29,084	-	-	29,084	0.4	0.4	145,637	-	-	145,637	0.3	0.4
Wire—Bale ties	27	10,757	-	-	10,757	0.1	0.2	33,484	-	-	33,484	0.1	0.1
TOTAL WIRE & WIRE PRODUCTS		381,497	3,889	2,755	388,141	5.3	5.7	1,892,073	24,926	15,531	1,932,530	4.3	5.0
Sheets—Hot rolled	31	686 786	27,520	2,087	716,393	9.8	10.1	4,206,104	141,619	14,454	4,382,177	9.9	10.4
Sheets—Cold rolled	32	965,506	3,188	14,552	983,546	13.5	15.8	6,018,607	23,595	84,732	6,126,934	13.9	16.3
Sheets—Galvanized	33	238,996	41	-	239,037	3.3	3.4	1,291,986	41	-	1,292,027	2.9	3.5
Sheets—All other coated	34	16,654	-	-	16,654	0.2	0.3	104,018	-	-	104,018	0.2	0.3
Electrical sheets & strip	36	11,519	48,075	-	59,594	0.8	1.0	56,516	303,022	-	359,538	0.8	1.0
Strip—Hot rolled	37	123,570	2,682	616	126,868	1.8	2.2	768,189	17,790	3,359	789,338	1.8	2.2
Strip—Cold rolled	38	83,846	1,793	16,272	101,911	1.4	1.8	520,484	9,920	102,469	632,873	1.4	1.9
TOTAL SHEETS AND STRIP		2,126,877	83,599	33,527	2,244,003	30.8	34.6	12,965,904	515,987	205,014	13,686,905	30.9	35.6
TOTAL SHIPMENTS (1957)		6,810,186	415,148	59,282	7,284,616	100.0	xxx	41,288,565	2,638,770	358,100	44,285,435	100.0	xxx
TOTAL — PRIOR YEAR (1956)		7,479,688	530,429	67,688	8,077,805	xxx	100.0	43,329,779	3,238,652	365,355	46,933,786	xxx	100.0

* Revised

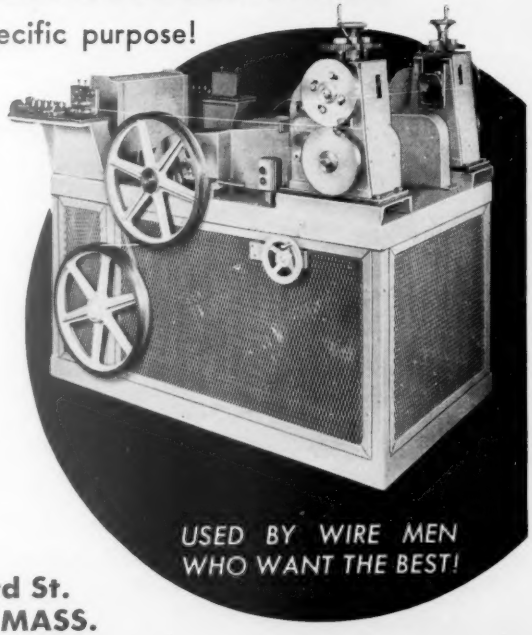
Sjogren

STRAIGHTEN and CUT-OFF for OIL TEMPERED BRUSH WIRE

Another specially designed machine for a specific purpose!

Wire mills furnishing oil tempered flat wire in cut lengths to the brush manufacturing trade will find an increased production rate with the use of a Sjogren specially designed straighten and cut-off machine — which will accommodate .020" x .060" to .025" x .090" sizes. Fast and accurate cuttings may be made; if desired, two different lengths and two different sizes of wire may be processed at one time — since the machine is equipped with two units, each with its own motor and controls. Typical production has shown that 500 pieces, 5" long per minute are available from each unit.

Cut-off lengths may range from 5" to 26" — which covers the majority of flat wire brush requirements.



USED BY WIRE MEN WHO WANT THE BEST!

Sjogren TOOL & MACHINE CO., INC.
SINCE S&S 1927

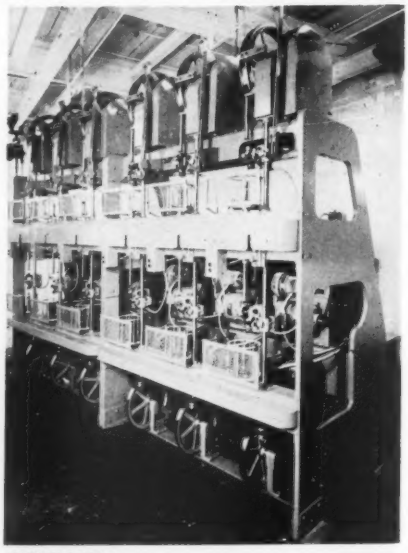
WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

14 Sword St.
AUBURN, MASS.

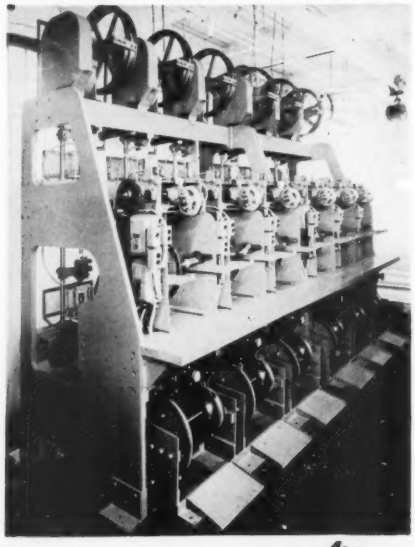
COPPER - Consumption of refined copper in the United States April-May 1957, in short tons

	Wire mills 1/	Brass mills 2/	Chemical plants	Secondary copper smelters	Foundries and miscellaneous	Total
April:						
Cathodes	602	7,755	(3)	91	(3)	8,448
Wire bars	69,869	5,035	(3)	---	(3)	74,904
Ingots and ingot bars	1,097	6,413	(3)	102	(3)	7,612
Cakes and slabs	-----	15,295	(3)	1	(3)	15,296
Billets	-----	12,846	(3)	---	(3)	12,846
Other	84	-----	(3)	44	(3)	128
Total	71,652	47,344	(4)	238	(4)	4/122,234
May:						
Cathodes	576	7,629	(3)	53	(3)	8,258
Wire bars	66,332	4,646	(3)	---	(3)	70,978
Ingots and ingot bars	1,251	7,362	(3)	92	(3)	8,705
Cakes and slabs	-----	14,403	(3)	---	(3)	14,403
Billets	-----	14,861	(3)	---	(3)	14,861
Other	93	-----	(3)	71	(3)	164
Total	68,252	48,901	(4)	216	(4)	4/120,369

1/ Includes all wire mills with rod-rolling facilities. 2/ Includes all brass mills using copper in refinery shapes; some have rod-rolling facilities. 3/ Not available. 4/ Consumption by chemical plants, foundries, and miscellaneous plants not included. Estimate of 3,000 tons included in total.



FRONT VIEW



REAR

EST. 1855 AIMCO INC. 1915

"American" INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

FAIRHILL AND HUNTINGDON STREETS

PHILADELPHIA 33 PENNSYLVANIA U.S.A.

3D-6-MBB TAPING MACHINE #1107

Applies double cover to 6 lines of wire simultaneously. Nominal wire range #6 to #18 B & S gauges (.162" to .040" or 4.116 MM to 1.024 MM). Standard Capstans 24" in diameter. Supply wire let-offs and torque motor driven take-ups for 24" diameter reels are at rear of machine.

JOIN

THE WIRE ASSOCIATION

Besides the direct benefits of being a member, those who join the Association can enjoy the feeling that they are uniting in the cooperative effort to better conditions in the industry.

ANNUAL DUES: $15.00

•

For this you receive the Association's Official Publication for one year—WIRE AND WIRE PRODUCTS.

•

You also get a copy of the directory—the WIRE AND WIRE PRODUCTS BUYERS' GUIDE AND YEARBOOK OF THE WIRE ASSOCIATION.

•

You are entitled to a free question and answer service on technical and operating problems.

•

You can attend the Annual Convention and the Regional Meetings of the Association at a saving in registration fees.

•

Personal contacts, too, are an advantage of the meetings.

▲

Write today for a booklet on the Association and an application card.

▼

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 Main St. • Stamford, Conn.

ALUMINUM PRODUCTION IN THE UNITED STATES
(in short tons)

1957	
June	138,657
May	144,789
Total for the year through June	823,969
1956	
June	145,726
Total for the year through June	860,304
All-time record month	
July 1956	151,624
All-time record quarter	
4th 1956	442,597

(*Continued from page* 1037)

flexible steel conduits embedded in concrete.

★ ★ ★

Last September — after several years of planning — earth-moving equipment began gouging out a level roadbed in what was once a field of goldenrod near the Graham Laboratory for J&L Research, on Baldwin Hill, in the City of Pittsburgh.

Giant Wire Rope Sling

A new giant in wire rope slings, 3 inches in diameter and furnished with the patented Dualoc Ending, has been perfected and introduced by the Wire Rope Division, **American Chain & Cable Company, Inc.**, Wilkes-Barre, Pa. The manufacturer recommends its use to fill a vital need in today's expanding materials handling programs for moving heavy power generating, industrial, marine and railroad transportation equipment.

★ ★ ★

Fabricated from 3 inch diameter 6 x 37 Preformed Improved Plow Steel wire rope, the sling's breaking strength is rated at 720,000 pounds with a safe working load of 144,000 pounds or 72 tons. The sling assembly is proof tested to 288,000 pounds, double the safe working load, at the manufacturer's plant with their new 300 ton capacity horizontal hydraulic testing unit.

faster butt welding

good acid neutralizing

longer storage with safety

rust inhibitor coating

longer die life

you get them all with . . .

BORAX 5 MOL.

and ONE DIP *is all that is necessary for coating wire and steel rods . . .*

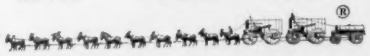
BORAX 5 MOL offers worthwhile advantages over regular borax as a satisfactory coating material on ferrous rods and wire in preparation for dry drawing. This newer material offers a higher concentration of sodium borate and therefore savings may be realized through reduced transportation, handling, and storage costs. Only about three-fourths as much Borax 5 Mol need be used to equal regular borax . . . yet you get the same worthwhile results!

Write to our Technical Department for further information

United States Borax & Chemical Corporation
PACIFIC COAST BORAX COMPANY DIVISION

50 Rockefeller Plaza, New York 20, N. Y.
630 Shatto Place, Los Angeles 5, Calif.

Los Angeles · New York · Chicago · Kansas City · Philadelphia · Cleveland



YOU NEVER KNOW
THE COST
OF A TOOL UNTIL
YOU HAVE TO
REPLACE IT!

UNLIKE SOME TOOLS
CAREW
CUTTING NIPPERS

don't have 1000 uses. They are made only for cutting wire.

CAREW NIPPERS will continue to do this year after year; cutting efficiently long after most tools have been junked.

MADE IN 4 SIZES
8", 10", 12", 14"

Jaws are made of hardened tool steel and are removable for sharpening.

STOCKED BY MOST MILL SUPPLY DEALERS

Made by
M. W. ROBINSON
COMPANY
ROCKFALL, CONNECTICUT

Enters Vacuum Melting Field

Newest entry in the rapidly expanding field of vacuum melting is the **Vaculloy Corp.,** Wooster, Ohio, organized recently by **James H. Johnston** and **Edward R. Funk,** who have had extensive experience in the melting and fabrication of titanium, steel and alloys through the **Johnston and Funk Titanium Corp.,** also of Wooster, one of America's pioneer producers of titanium wire.

★ ★ ★

The new firm is currently engaged in custom vacuum melting of titanium, steel and other alloy for research, laboratory and development purposes, using its own improvement of the consumable electrode double melting technique.

★ ★ ★

Vaculloy's officers point out that while the present demand for less weight and more strength in metals has given vacuum melting and unprecedented impetus, only full-time specialization in this type of melting can broaden its usefulness to industry.

Chemo-Tape of Teflon

The Chemo-Plastics Division of **Chemo-Textiles, Inc.** announces the addition of Teflon Tape to its list of insulating materials being supplied to the insulation field.

★ ★ ★

This tape has many superlative insulation qualities, a few of which are — excellent arc resistance, retains electrical properties over a temperature range of -100°F to 500°F, chemically inert and moisture resistant, dielectric constant between 2.00 and 2.05 and others.

★ ★ ★

Used as an insulating wrap, Teflon tape has excellent tensile strength and high elongation values, allowing it to stand rough treatment in application and use.

★ ★ ★

Also Teflon's chemical and mechanical properties make this Chemo Tape applicable in many industrial uses, such as, tank linings and bearing surfaces. It is avail-

Wire dies have longer life when finished with
HYPREZ
DIAMOND
COMPOUNDS

For every job, Hyprez quality, economy and dependability are recognized as unsurpassed. Your nearby Hyprez distributor will help you solve any difficult lapping or finishing problem that may arise.

Ask for a Free Demonstration or Technical Bulletin No. HW-97

HYPREZ DIVISION
ENGIS
EQUIPMENT CO.
431 S. Dearborn St.
Chicago 5, Ill.

REDUCE YOUR OPERATING EXPENSES WITH EXPERIENCED

Plandex Plastics Reworking Service

STRAINING, CLEANING AND PELLETIZING

Polyethylene Film!

Recompounding with Additives TO IMPROVE FLOW CHARACTERISTICS OF PLASTICS SCRAP

VIRGIN MATERIALS *Compounded To Your Recipes*

LABORATORY QUALITY CONTROL WITH TESTS EVERY 30 MINUTES

• PLANDEX METHODS REDUCE WEIGHT LOSS AND IMPROVE YOUR PROFIT POSITION!

Plandex does not own a single ounce of scrap plastics, concentrating on streamlined reclaiming service alone. Our production line is equipped with Welding Engineers' customized dual worm compounder-extruders and with "know-how" that assures accurate interpretation of your specific requirements.

Write for literature or sales engineering appointment.

PLANDEX CORPORATION
DOWNINGTOWN, PA.
PHONE ANDREWS 9-2130

able in colors and natural white in various widths and thicknesses.

★ ★ ★

Product information and data sheets are available on request. Write Chemo-Textiles, Inc., P.O. Box 169, West Warwick, R. I.

Adds New Potentiometer Wire

A new precious-metal alloy for potentiometer wire offering very high resistivity plus a negative temperature coefficient or resistance has been developed by **Baker & Co., Inc.**, 113 Astor St., Newark 2, N. J., one of the Engelhard Industries.

★ ★ ★

Entering the potentiometer-wire field for the first time, Baker will become the only American company offering a complete line of potentiometer wire and contacts, announced **C. R. Bergherm,** vice-president in charge of the manufacturing division. The company also is working on two other new high-resistivity alloys which will offer unusually low temperature coefficients.

★ ★ ★

Since the high-resistivity alloys permit the use of less wire, designers will be able to reduce the size of some instruments while retaining a given resistance. In other cases they will be able to avoid the use of very fine wire without decreasing resistance.

★ ★ ★

The new high-resistivity alloy presently available is composed of palladium, gold, and iron. It has a resistivity of 1100 ohms per CMF and a temperature coefficient of -2.8×10^{-4} ohms per ohm per degree C between 0 and 100 degrees C.

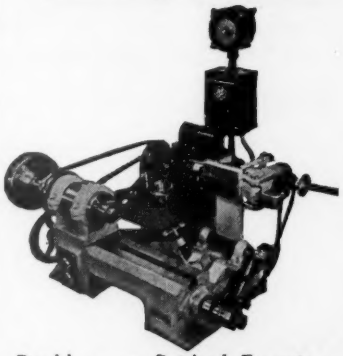
★ ★ ★

Three alloys are already in use in this field: platinum-tungsten, with a resistivity of 400 ohms per CMF and a temperature coefficient of resistance of 2.3×10^{-4}; platinum-rhodium-ruthenium, with a resistivity of 180 and a temperature coefficient of 6.7×10^{-4}; and platinum-gold-silver-copper-zinc, with a resistivity of 80 and a temperature coefficient of 6.2×10^{-4}.

CUT Die Room COSTS 50% with the New type "M"

DYKREX "IT CORRECTS THE DIE"

automatic Polishing Machine



Double your finished Tungsten Carbide Die production

•

Save ½ labor costs—

•

The new automatic polisher with the Time Switch—

•

It is completely assembled—just plug it in!

ROOS TOOL & MFG. DIVISION
Dykrex Corporation of America
manufacturers of
Wire Die Finishing Machinery

33 Bloomfield Avenue
Newark 4, N. J.

Phone: Pilgrim 4-1500

Western Union
Teletype Service
QAB-WUX—Montclair, N. J.

The Standard of the Wire Industry

Solves BIG-REEL handling problems

Lifts, tilts, turns loads up to 1500 lbs, easy!

If you shudder each time an employee crashes a big loaded reel on its side, then you should look into this special ACROMETAL handling equipment. It's a pneumatic reel lifter, used with a hoist, and it has a mechanically operated safety lock that holds reel in position if air supply should fail.

Note the trolley on the curved arm. That makes it easy to pick up a reel in any position, turn it to horizontal or vertical, swing it to a pallet. Maneuvering 1500 lb. loads is no job at all—even a girl can do it. Lifter will handle reels with 5" arbors, up to 30" diameter and maximum overall width of 13½".

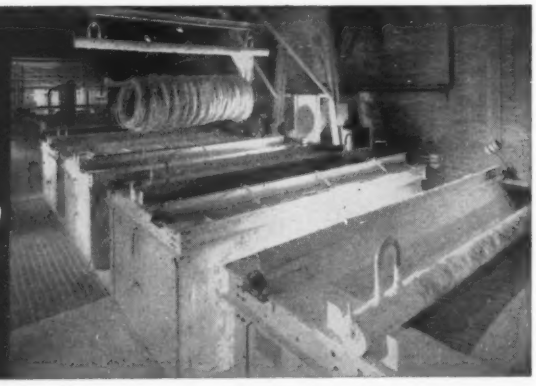
No more bouncing or crashing on floor to change reel position

One plant manager said this equipment would save him $10,000 a year on floor repairs alone—to say nothing about the cost of repairing damaged reels. It eliminates a major accident hazard and insures against distorting the lay of the wire. This lifter treats your wire and reels with respect! **Write or call us.**

ACROMETAL PRODUCTS, INC.
616 North 5th Street MINNEAPOLIS 1, MINNESOTA

carl mayer

HI-SPEED REGISTERED **ROD BAKERS**



Faster baking, greater fuel economy, maximum production efficiency are just a few of the results of the exclusive heating arrangement of the Carl Mayer Hi-Speed Rod Baker. It also has a patented blow-off feature which removes moisture without damage to coils.

Here are just a few of our many satisfied customers:

American Steel & Wire Co.
Atlas Steel Co.
Colorado Fuel & Iron Corp.
Crucible Steel Co. of America
Driver-Harris Co.
B. Greening Wire Co., Ltd.
Indiana Steel & Wire Co.
Jones & Laughlin Steel Corp.
Republic Steel Corp.
Sheffield Steel Div., Armco Steel Corp.
Steel Company of Canada

Write for Bulletin No. 350

Patent Nos.
U. S. A. 2,296,361
2,323,828
2,235,559
Canada 396,144
401,589

THE **carl mayer** CORP.
3030 EUCLID AVE., CLEVELAND 15, OHIO

OTHER PRODUCTS: Core Ovens • Mold Ovens • Welding Rod Ovens • Heat Treating Ovens & Furnaces • Special Processing Equipment and Accessories.

Semiconductor Committee Named by NEMA

The National Electrical Manufacturers Association has announced the formation of a special informational committee to keep industry and the public abreast of new developments in the semiconductor field—a rapidly expanding industry whose devices are used in applications ranging from household appliances to heavy industrial equipment.

★ ★ ★

The term "semiconductor" refers to certain materials used in electrical devices to oppose an electric current flow in one direction and to pass current flow in the other direction. These materials, which include germanium, silicon, selenium, copper oxide and magnesium copper sulphide, have been used as the basis for recent developments in the design of rectifiers, diodes and transistors.

★ ★ ★

The committee is composed of top engineering and public relations executives of representative NEMA member companies in the Section. They include: **Julian Lobenstein,** Brooklyn, N.Y., Section Chairman and Sales Manager, Radio Receptor Company, Inc.; **Bert G. Lattimore,** Buffalo, N.Y., Sales Staff Assistant, General Purpose Control Department, and **Edward J. Laughlin,** Sales Manager, Metallic Rectifier Section, Motor and Control Division, both of Westinghouse Electric Corporation; **Gordon L. Nord,** Rossmoyne, Ohio, Vice President, Schauer Manufacturing Corporation; **Fred Spaugh,** Manager, Marketing Research, Rectifier Department, and **John M. Warner,** Manager, Advertising and Sales Promotion, Rectifier Department, both of General Electric Company at West Lynn, Mass.; and **H. Paul Weirich,** North Chicago, Ill., Administrative Assistant, Rectifier - Capacitor Division, Fansteel Metallurgical Corporation.

Catalogs Wanted

The Office of Small Business has received a request from the ICA Mission to Laos for descriptive

literature, specifications and prices on nails, screws, barbed wire and woven wire cloth.

★ ★ ★

Firms may send their catalogs to United States of America Operations, Mission to Laos, care American Embassy, Vientiane, Laos.

Use of Electricity to Rise

The Federal Power Commission, it is stated in the February issue of NEMA News, has issued a report on the future power needs of the country.

★ ★ ★

Interior Secretary Fred A. Seaton estimates that it will take 40 billion dollars to finance this expansion in the next 10 years and a total of 94 billions to cover the costs in the coming 20 years.

★ ★ ★

A vast potential is seen in American homes, in which 3000 kilowatt hours are consumed now on the average. It is expected that the home of the future will use 20 to 25,000 KWhr.

★ ★ ★

This increased use of electricity will call for more electrical appliances, involving a greater use of wire, and the extra wiring for houses will require added quantities of wire. Coupled with this will be an expansion of electric utility plants and enlarged industrial production facilities, all involving electric wire and cable on a greater scale than heretofore.

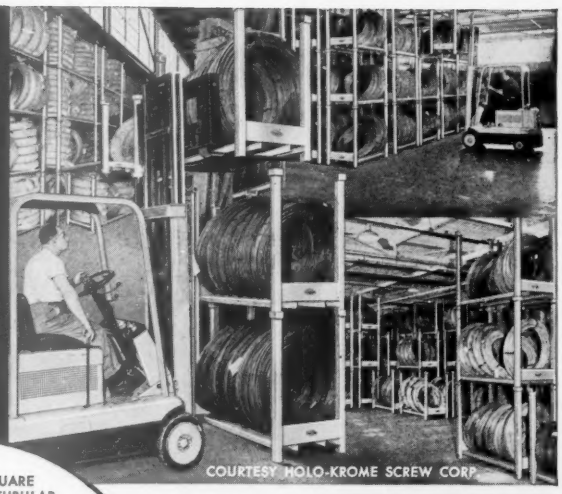
★ ★ ★

Impetus to this is being provided by the "Live Better-Electrically" campaigns now in progress and that will be stepped up in tempo in the coming years. This promotional project represents the combined efforts of all segments of the electrical industry to provide adequate wiring for greater use of electrical equipment.

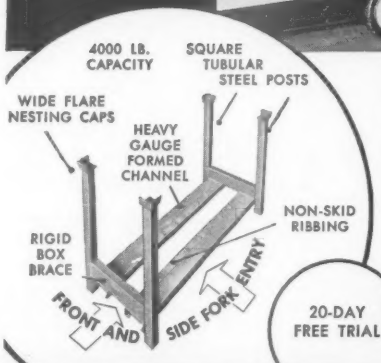
Pre-Assembeld Stacks of Spring Washers Described in Bulletin

To describe its new compact energy "cartridges, which consist of pre-assembled stacks of multiple Belleville spring washers held

JARKE
PORTABLE
WIRE COIL RACKS



COURTESY HOLO-KROME SCREW CORP.



Solve Wire Coil Storage Problems

Makes handling and storing of unwieldy wire coils a simple one-man operation. Improves plant housekeeping, saves space, provides positive inventory control. Front and side fork entry permits closer stacking and greater maneuverability in narrow aisles. Saves time, labor, cuts costs. Standard and special sizes.

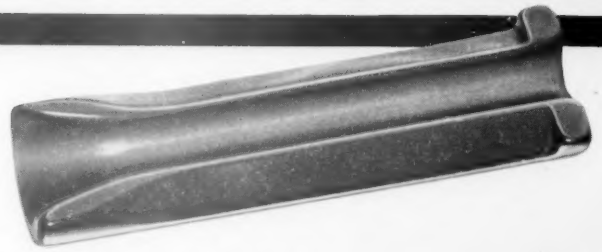
20-DAY FREE TRIAL

JARKE MANUFACTURING COMPANY

Send for Details
5407 Broadway
Chicago 40, Ill.

MODULAR STORAGE SYSTEMS FOR METAL INDUSTRY • STEELMOBILE

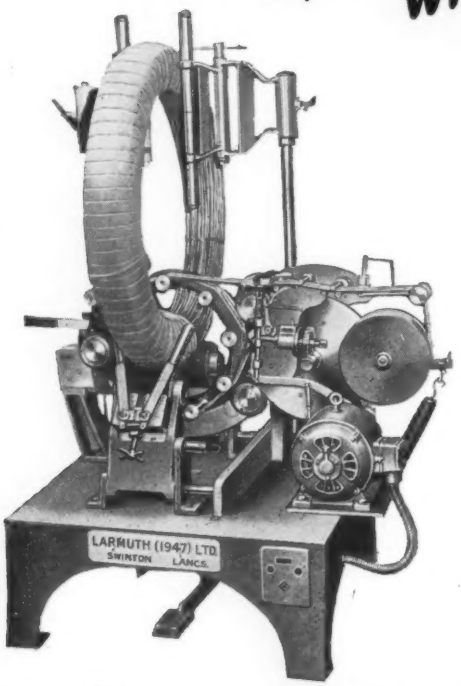
SAVE DOLLARS ON ASBESTOS WIRE INSULATING-POLISHING



With Beard Whirler Dies and Die Heads you'll save time and money in applying asbestos insulation and in polishing paints and compounds on insulated wire. Order the whirler dies you require from stock. Over 100 sizes immediately available. No costly delays or bottle necks. Dies may be used in wet whirlers or polishing heads. Made of heat-treated polished steel for highest accuracy and minimum wear. Write for spec sheets and detailed data TODAY.

BEARD MACHINE COMPANY
32 N. TREMONT STREET • YORK, PENNSYLVANIA

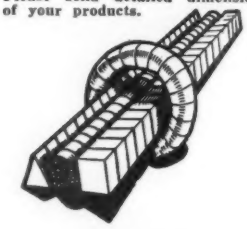
LARMUTH *Spiral Wrapping* MACHINES



are built to finest British engineering standards and are in use throughout the world for spiral wrapping of Motor Tyres, coils of Wire, Strip, etc., from 3" bore upwards. Also straight length Tubes, Bars, Rods, etc.

"BOUND" to get there safely.

Please send detailed dimensions of your products.



LARMUTH *of England*

U.S.A. Agents: Machinery & Machine Supplies Co., Inc.
305 East 47th St.,
New York 17, N. Y.
Telephone: Plaza 8-0744-5-6-7

LARMUTH (1947) LTD., EAST LANCASHIRE ROAD, SWINTON, MANCHESTER, ENGLAND.
Telephone: Swinton 1015

PROFITABLE STRIPPING

OF YOUR SCRAP AND REJECTED WIRE & CABLE IS GUARANTEED WHEN YOU HAVE THE RIGHT MACHINE ON THE JOB.

Many of our machines have been in service up to 10 years. Our later MODEL "526" (pictured), with a capacity of 5/16" to 6", is now the accepted leader in the scrap and salvage trade. Strips short or long lengths, or off the reel.

For FAST and CLEAN CUTTING, in most cases actually taking the cable apart. No other machine can match the patented cutting action of the "526".

SAVES ALL RUBBER, PLASTIC, LEAD, COPPER AND ALUMINUM

Several models available for small or special work and plastic tubing.

Detailed information available—ask for it

HOWARD A. BURDWOOD, INC.

P. O. BOX 2115, 120 THADEUS ST., SO. PORTLAND, MAINE

together by pins or rivets passing through the washers at or near their neutral axis, **Associated Spring Corp.,** Bristol, Conn., has published a new 6-page bulletin.

★ ★ ★

Exploded views show how the washers are assembled, and schematic drawings illustrate several typical applications for the "cartridges."

★ ★ ★

The "cartridge," a patented design, provides a compact unit that can be incorporated as a one-piece component in the final machine and as such is easier to handle and install than loose washers.

★ ★ ★

Copies of the bulletin may be obtained free on request from Associated Spring Corporation, Bristol, Conn., or any of its divisions in the principal cities of the U. S. and in Canada.

Submerged Arc and Inert Gas Welding Wire

This 4-page folder, Bulletin DH-402A, describes the many Page methods of packaging welding wire including their newest innovation—Payoffpaks. It has been made available by the **Page Steel and Wire Div.,** American Chain & Cable Co., Monessen, Pa.

★ ★ ★

In addition, the bulletin gives complete and up-to-date analyses of the various Page stainless steel, low alloy, and carbon steel welding wires.

CF&I Taps New Furnace

The Colorado Fuel and Iron Corp. has completed a new open hearth furnace at its Pueblo, Colorado steel plant, according to **A. F. Franz,** president of the company. The first heat of steel was tapped on March 17th.

★ ★ ★

This new No. 17 furnace is of modern design and has a capacity of 230 tons per heat. It is the largest furnace in the Pueblo open hearth shop. Construction was carried on simultaneously with improvements that were being made

to the other sixteen furnaces which will increase the annual rated steel capacity of the Pueblo plant from 1,485,000 to 1,800,000 tons.

★ ★ ★

One of the major improvements has been the conversion of the furnaces to a double ladle heat practice which permits the steel to be tapped into two ladles rather than the one ladle used previously.

The Wire Economy of Egypt

The plant for the production of wire and electric cable, equipped with modern machines and opened in the Spring of 1955, has developed favorably. It is located in the industrial district of Helwan, South of Cairo. There is a good demand for wire and cable, and also for nails, zippers and other hardware. The factory was built with the participation of two French firms. Production is expected to reach a yearly output of 2,000 tons of wire and cable. In addition, 5,000 tons of underground cable will be produced.

★ ★ ★

Egypt imports yearly about 10,000 tons of wire and electric cable. The projects for the industrialization of the country, have increased the demand, which can be only in part covered by Egyptian production.

★ ★ ★

In order to get relief from these circumstances negotiations are in progress for the building of a second plant. The Suez crisis delayed the project, which will be devoted to the manufacture of telephone wire and cable.

★ ★ ★

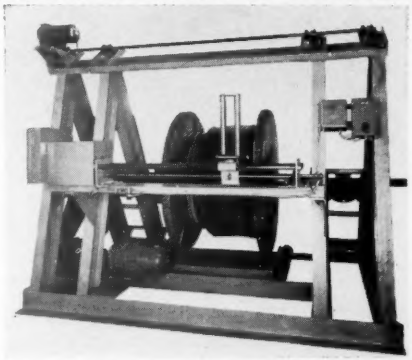
There are said to be five firms that manufacture nails. Two firms employ 150 persons in the manufacture of zippers, the production of which amounted in 1954 to around 1.3 million yards.

Miniaturized Series of Locking Inserts

A miniaturized series of self-locking wire thread inserts has been introduced by the **Heli-Coil Corp.** of Danbury, Conn., to meet the needs of design engineers over a wide range of small, precision ap-

LARGE REEL TAKE-UP

FOR USE WITH OUR LARGE FOUR-WIRE TWISTING MACHINES OR PLANETARY CABLES



Made in sizes to accommodate reels up to 84 inches in diameter.

It is an arborless type. The driving shaft is hollow, with an extensible solid shaft that centralizes the reel and drives it. The idle shaft is moveable back and forth by means of a gear and rack, controlled by a hand wheel.

The reel to be loaded is placed on the loading platform, rolling in machined ways and is pushed onto the driving shaft by the idle shaft and hand wheel.

The reel is lifted to the operating position by four motor driven enclosed lifting screws, equipped with limit switches.

The traverse mechanism is a single screw, reversed by Warner Clutches and having its rate of lay controlled by change gears. It can be positioned and moved by hand.

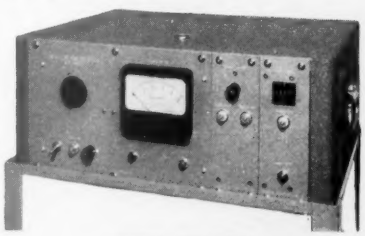
The reel is driven by a Louis Allis Adjusto Spede Drive coupled to a four speed Drive-All Unit, to give constant tension on the cable being taken up.

Write for further information.

THE EDMANDS CO. 860 WELLINGTON AVE., CRANSTON 10, R. I.

MORE EFFICIENT WIRE SPARKING ACHIEVED WITH PESCHEL HV DC SPARKERS

- FAST: For wire speeds up to 4000 ft/min.
- EFFICIENT: 1" Electrode sufficient. Save floor space.
- ACCURATE: Registers *EVERY* fault. *(Impossible with 36" electrode)*
- NON-DESTRUCTIVE: No burning or marking of wire.
- SAFE: Non-lethal output (unlike AC Sparkers)



MODEL 10 CV-X
(Floor stands available also)

SELF-TESTING AND EASY MAINTENANCE—Sectionalized construction, supervisory circuits and panel indicators enable quick location of defective section, which unplugs for quick removal and replacement with spare. Factory carries spares earmarked for this equipment and available for immediate air express shipment to any place in the world.

USED BY LEADING INSULATED WIRE CONCERNS

Alphaduct Wire and Cable Co.
Circle Wire and Cable Corp.
Electric Auto-Lite Co.
General Cable Corp.
General Electric Co.
Hitemp Wires Inc.
Hudson Wire Co.
Kerite Company
John A. Roebling's Sons Corp.
Superior Cable Corp.
Tensolite Insulated Wire Co.
Warren Wire Co.

MEETS IPCEA • NEMA • ASTM • USAF • MIL • JAN and ALL OTHER STANDARDS

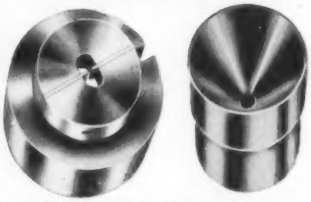
Send for information on this new, efficient sparker

PESCHEL ELECTRONICS, INC.
13 GARDEN STREET • NEW ROCHELLE, N. Y.
Tel.: NE 6-3342

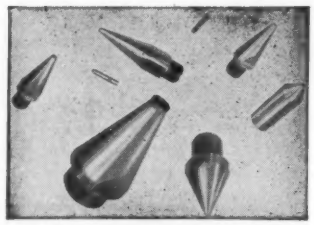
INSULATING DIES AND NOZZLES
for EXTRA-HIGH ELECTRIC WIRE PRODUCTION

CARBIDE AND STEEL

Highest Quality Workmanship and Materials. Standard Types and Special.



STEEL DIES—ALL SHAPES.



CARBIDE EXTRUSION NOZZLES OR TIPS FOR ALL MACHINES.

BRIDGEPORT CARBIDE NOZZLES have phenomenally long life, will lower operating costs and reduce wire breakage.

BRIDGEPORT STEEL DIES are made in Round, Figure 8, Serrated, Tracer and other Special Shapes to your specifications. A newly designed Tru-Rip Die Assembly can be taken apart, cleaned, blades changed and reassembled quickly and easily. Made for 2 and 3 conductor wires to be coated in extrusion machines.

Write for folder or phone for information

WIRE TOOL DIVISION

BRIDGEPORT JIG BORING COMPANY

102 CENTRAL AVENUE, BRIDGEPORT, CONN. TEL.: FOREST 7-8473

Export Dept. ANDOVER INTERNATIONAL INC., 10 BRIDGE ST., NEW YORK 4, N. Y.
CABLE Address ANDONIK

LEADER IN HIGH PRODUCTION EXTRUSION TOOLS FOR ELECTRIC WIRE

AT YOUR SERVICE

SPECIALIZED ENGINEERING
SPECIALIZED EXPERIENCE
SPECIALIZED MACHINERY
FOR
TWISTING • STRANDING • BUNCHING
Continuous Tension Control
For Precision-Quality

HASKELL-DAWES
MACHINE CO., INC.
2231 E. Ontario Street
Philadelphia 34, Pa.

plications. The new 4-40 Screw-Lock series was designed to reduce the space and weight limitations of handling fastener problems on electronic, automotive, aviation, machine tool and instrument assemblies. Easily installed, they provide the answer to threaded fastening problems in miniature subassemblies where clearance or inacessibility does not permit the use of external locking devices.

★ ★ ★

They eliminate the need for lock washers, lock nuts and locking wires with an integral gripping coil. The locking effect remains through repeated cycles of disassembly and a locked screw may be readily freed by applying breakaway torque approximately the same as used in the original assembly.

New Catalog on Silicones

A new illustrated catalog discussing more than 115 different applications for silicones is now available from the **Silicone Products Dept., General Electric Co.,** Waterford, N. Y. Among the important silicone uses described are rubber products, cosmetics and polishes, electrical insulation, water repellents, textile finishes, lubricants, release and anti-foam agents.

★ ★ ★

Designated CDS-97, the condensed eight-page catalog lists specialized literature covering product and application information as well as major G-E silicone products.

Reynolds Metals Publishes Condensed Catalog

Reynolds Metals Co. has published a new eighteen-page condensation of its Mill Products Catalog for 1957, intended as a convenient reference guide for preliminary discussion of design and fabrication considerations.

★ ★ ★

New features include information on industrial foil and revised, clearer weight charts for wrought and casting alloys. It includes selection guides for wrought alloys in sheet, plate and foil, wire rod and bar, tubing and pipe, extruded

and structural shapes, and for casting alloys.

★ ★ ★

Also included is helpful information on fabricating and finishing aluminum products, the company's styling and engineering services and a selected list of company literature and films.

★ ★ ★

The brochure is titled "1957 Reynolds Aluminum Mill Products." Copies can be obtained from Reynolds Metals Company, 2500 S. Third St., Louisville 1, Ky.

Slide Chart Issued on Machining Stainless Steels

A new pocket-size slide chart on machining stainless steels is now available from **The Carpenter Steel Co.,** Reading, Pa. The chart measures 9¼" x 4¾" and contains a wealth of the latest information on how to machine the popular grades of stainless. On one side it gives concise data on turning, drilling, tapping, threading, milling and reaming operations. It tabulates speeds and feeds, and gives special notes on drilling, tapping, lubrication and welding. The other side of the chart shows relative workability of stainless steels in a wide variety of operations including blanking, deep drawing, stamping, forging, heading, roll threading, welding, etc. An inserted slide moves to show, at a glance, the machining data desired.

★ ★ ★

For one of these charts, write The Carpenter Steel Co., 3050 West Bern St., Reading, Pa.

Bulletin on Moly Lubricants for Wire

A new bulletin entitled "Application Data on Molykote Lubricants" has been issued by **The Alpha Molykote Corp.,** 65 Harvard Ave., Stamford, Conn.

★ ★ ★

In this are listed 14 case histories of various concerns in their use of molykote, a molybdenum disulfide additive for both wet and dry drawing lubricants in drawing ferrous and nonferrous wires. Op-

FOR THE FINEST IN

METAL PICKLING COMPOUNDS

SPECIFY

PARKIN PRODUCTS

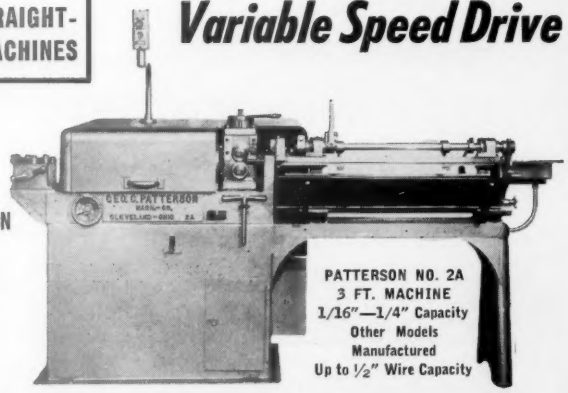
SUMFOAM—pickling compound
NEP—acid inhibitor
NEPTUNE—accelerator

THE PARKIN CHEMICAL COMPANY
HIGHLAND BUILDING, PITTSBURGH 6, PA.

GEO. C. PATTERSON
HI-SPEED
AUTOMATIC WIRE STRAIGHTENING & CUT-OFF MACHINES

Electrically Operated with Variable Speed Drive

- MINIMUM COST
- MAXIMUM PRODUCTION
- ACCURATE LENGTHS
- NEW FEATURES



Write for free literature on your requirements

THE GEO. C. PATTERSON MACHINE COMPANY
3409 TRUMBULL STREET
CLEVELAND 15, OHIO

PHONE: BROADWAY 1-1808

erating data and results on wire finishes and die life are given.

★ ★ ★

Copies of the bulletin will be mailed by the company upon request.

Folder on Worm Gear Drives

A new sixteen-page, illustrated brochure—Finger Tip Facts on Cleveland Worm Gear Drives—provides useful summary information on the complete standard line of speed reducers, worm gear sets and special units manufactured by **The Cleveland Worm & Gear Company.**

★ ★ ★

Designated Bulletin #145, the booklet is available upon request to the factory, 3249 East 80th Street, Cleveland 4, Ohio.

NE-BUTT CO

MACHINERY FOR HIGH SPEED PRODUCTION

- BRAIDERS
- CABLERS
- TAKE-UPS
- BUNCHERS
- STRANDERS
- TAPING MACHINES

NEW ENGLAND BUTT CO.
Division Wanskuck Company
304 Pearl Street · Providence 7, R. I.
James Day (Machinery) Ltd. • 28 Maddox Street, London W1, England

THE WIRE ASSOCIATION

invites wire men to join the organization and participate in its activities.

Write for a booklet on what it is and how it functions to

RICHARD E. BROWN
Executive Secretary

453 MAIN STREET STAMFORD, CONN.

WE BUY WE SELL

We Pay Highest Prices for Used Machinery

1—N.E.B. 7-WIRE UPRIGHT PLANETARY TWISTER, COMPLETE.

12—24-CARRIER WARDWELL BRAIDERS FOR 36" REELS.

3—7 WIRE STRANDERS AND 1—19 WIRE STRANDER

All Machines Reconditioned in Our Own Shop

WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

New Trends in High Temperature Cables

(*Continued from page* 1016)

up to 5000 volts is now being used as appliance wires, aircraft cables, power wiring, and heating cables. For mechanical protection during handling, either a glass or asbestos braid usually covers the silicone rubber. Significant production economies brought about through improved manufacturing techniques have reduced prices of these cables to practically the same as those for similar asbestos-insulated cables, thus increasing acceptance of silicone rubber throughout industry.

★ ★ ★

Extrusion methods for heavy insulation walls necessary at voltages above 5000 volts have not been worked out. But an insulation is available that can be used on cables rated up to 35,000 volts. In 1953 a glass tape coated with a General Electric silicone rubber became available for commercial use. Consisting of a 4-mil base glass-fabric tape coated on both sides with silicone rubber to a total thickness of 10 mils, this material maintains excellent electrical properties at 125 C. In 14-day aging tests at 250 C, these properties not only are retained but also actually improve to some extent. Additionally, the material has excellent dielectric strength and corona resistance, low moisture pickup, and good physical properties.

★ ★ ★

Made in 1954 by a large eastern electric utility, the first high-voltage installation of cable insulated with silicone-rubber glass tapes was made on a 15-kv generator unit that carried thermal bottlenecks and inadequate cables. The cables were single-conductor 2500-MCM copper conductors conservatively rated at 125 C copper-operating temperature—an ampere rating of about 40 percent more than conventional cable.

★ ★ ★

In progress since its manufacture, long-time laboratory tests on this cable indicate general improve-

ment of its electrical properties with age. They also point up the value of reducing wall thickness on future cables.

High-Temperature Application

Silicone extruded-rubber insulated cables are increasingly used in hot locations where conventional rubber or asbestos cables have given trouble: for instance, on power and control cables of electrically driven ladle cars at the Hanna Nickel Smelting Company plant at Riddle, Oregon. These ladle cars transport large ladles, filled with molten material. Formerly, the conventional heat-resistant cables had to be replaced every three or four weeks because of insulation failures. In the past year or so, the use of silicone cables indicates that the new insulation can readily withstand the heat involved. The failures that did occur were caused by mechanical rather than temperature limitations. It is hoped that improved mechanical design such as flexible conductors and flexible stainless-steel outer braids will in the future eliminate practically all cable failures.

★ ★ ★

As the cost of silicone rubber decreases, its use will increase to the extent that it will probably replace asbestos-varnished cambric as a general-purpose high-temperature cable insulation. Allowing equipment operation at higher temperatures than previously possible, silicone-rubber insulated cable fits the trend toward Class H equipment for use in prolonged high temperatures or occasional overloading. It offers a new standard-cable insulating material for the heat-plagued glass and metals industries.

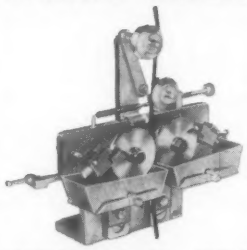
Firth Sterling Organizes Canadian Affiliate

Firth Sterling Inc., Pittsburgh, Pa., announces the formation of a Canadian corporation, **Firth Sterling (Canada) Ltd.** Financed jointly by Firth Sterling and Canadian interests, the new corporation initially will produce tungsten carbide tips for sale to the manufacturers of rock bits.

★ ★ ★

A plant is being constructed at Brantford, Ontario, with the necessary machinery and equipment for the production of sintered carbides from mixed carbide powders to be supplied by Firth Sterling Inc. High purity hydrogen will be available from electrolytic facilities which will be installed within the plant. Initial production of Firth Sterling (Canada) Ltd. should begin in the third quarter of 1957. It is proposed that Firth Sterling (Canada) act as sales representative in Canada for other Firth Sterling products. The charter provides for expansion and diversification into other fields.

MARKING WHEELS and MACHINES for ELECTRIC WIRE



Gillies Engraved Concave Wheels are widely used for printing on rubber or plastic coated wire, for code or manufacturer identification. Machines print on ONE or BOTH SIDES in large legible letters. Wheels adaptable to any machine or we will supply machines. Wheels, shafts, ink pans and all accessories readily removable for quick and easy cleaning. Wheels of TOOL STEEL, HARDENED to Rockwell test 61-64 and HARD CHROME PLATED.

Send for samples of wire and prices on wheels and equipment

DUNCAN M. GILLIES CO., INC. Post Office Box 181 WEST BOYLSTON, MASS.

Telephone: West Boylston TE 5-4445

REELS and SPOOLS

ALL SIZES

WOOD - PLYWOOD - WOOD - METAL

RETURNABLE • TO ORDER • NON-RETURNABLE

Samples and Prices on Request

DURKEE MFG. CO. • PINE RIVER, MINNESOTA

SILVER COATED COPPER WIRE

Various weights of silver

To ASTM and MIL Specifications

Single strand on spools

THE MONTGOMERY COMPANY

Est. 1871

25 CANAL STREET Tel.: National 3-3336 WINDSOR LOCKS, CONN.

MOLDED WIRE BRAIDER SPOOLS

SMOOTH SPOOL HEADS will not break, warp, knick or rough-up—reducing maintenance costs. The instant locking feature saves time locating "dog-hole". Lighter than metal spools with less wear on Braider and Winder.

Contact us regarding your Spool Problems.

Stocked and sold exclusively by

STANDARD MILL SUPPLY COMPANY

31 ESTEN AVE., PAWTUCKET, R.I.

Telephone, PAwtucket 3-1534

WIRE DRAWING MACHINERY
AND EQUIPMENT

FINE WIRE MACHINES • SPOOLERS • POINTERS
PATENTING, TEMPERING, GALVANIZING AND TINNING EQUIPMENT FOR WIRE

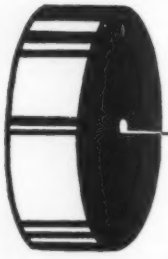
WRITE FOR PRICES

SUPERIOR TOOL & MANUFACTURING CO.
172 UNION STREET • WORCESTER, MASS.

MUSIC WIRE and SPECIAL WIRES

Music Wire for Industrial Purposes
211 sizes Bright Polished, .0015" to .3437"
45 sizes Bright Tinned, .003" to .125"
Aluminum—Annealed—Belt Lacing—Brass, Soft and Spring—Copper, Bare and Tinned
Coppered Steel Spring—Galvanized—Tinned
Monel—Nickel Silver—Pure Soft Nickel—Oil Tempered, Steel Spring, Black Finish
Phosphor Bronze, Spring Temper—Pure Iron Wire—Resistance Wire,
Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000 in an Envelope—Florist Wire—Spooled and Coiled, 1/4-1/2-1-5#
Wires Straightened and Cut to length—Small Gauges—Small orders our specialty
Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless.
Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

THE MALIN & COMPANY
2514 Vestry Ave. Established in 1884 **Cleveland 13, Ohio**



FOR WET DRAWING AND CLEANING COMPOUNDS
SPECIFY
PERMAG

For more than 33 years, Magnuson Products Corporation has helped solve difficult wire drawing and cleaning problems at considerable savings.

Write, wire or phone today and find out how Magnuson can help you expedite production.

MAGNUSON PRODUCTS CORPORATION
50 COURT ST., BROOKLYN 1, N. Y. In Canada: Canadian PERMAG Products, Ltd., Montreal

Die Refinishing With Boron Carbide Abrasive

(*Continued from page* 995)

is important, the final lapping operation should be done with diamond abrasive or diamond powder. This will readily polish the dull gray surface. In this case, the boron carbide is used to finish the hole slightly undersize. The final operation with the diamond abrasive brings the hole to the final proper dimension and imparts the high polish desired.

★ ★ ★

A little experimenting with the abrasive by the operator will soon show him the proper procedure. For example, applying the compound liberally will insure faster cutting. This will also counteract any tendency of the compound to dry out while the needle is in operation.

★ ★ ★

The decision to use boron carbide abrasive should be based on economic considerations. If diamond were plentiful and inexpensive, it would be the logical medium to use. Since this is not the case, many die refinishers have turned to this abrasive for ripping and semi-finishing operations as a practical way to keep their reworking and refinishing costs to a minimum.

Nylon in Wire and Cable

(*Continued from page* 1003)

The new "Zytel" 37X appears to be the answer to outdoor weatherability, but is still in the evaluation stage.

★ ★ ★

Overall, the volume usage of "Zytel" in wire and cable is large at present and increasing rapidly. New compounds are continually under investigation which will possess improved properties.

★ ★ ★

We anticipate a bright future for "Zytel" in wire and cable, and will bend every effort to find new applications for its use in this most critical industry.

You Can Depend on "NATIONAL"

DIAMOND POWDERS

For Consistent High Quality

They Are ALWAYS Clean, Sharp and Accurately Graded for Use.

ONLY TOP QUALITY GRADES!

SPECIAL SERVICE

DIAMOND POWDER RECLAIMING

Our exclusive process gives maximum recovery, highest salvage. Send us your old cotton, die washings, sludge and wheels.

DIAMOND GRINDING WHEELS

A complete line of fine quality wheels for industrial production.

Write for information and prices on our several services.

NATIONAL RESEARCH COMPANY

25530 LITTLE MACK AVE.
ST. CLAIR SHORES, MICH.

WWU

HIGH TENSILE AND MILD STEEL WIRES

SPECIALITIES:
HIGH STRAIN ROPE, CABLE, MATTRESS, AND SPRING WIRE

WESTEBBE & WEISPFENNIG
WIRE WORKS
UNNA (Westf. Germany)

Rope Wire Questions and Answers

(*Continued from page* 1008)

Further Comment

Upon receipt of this advice, after expressing appreciation of the assistance given, the questioner added comments of his own, stating also that investigations are in progress on patenting temperatures that will be published in due course. The letter reads:

"I agree on the conceptions and information which were given by the mills questioned by you. In detail I like to point out as follows:

★ ★ ★

1. Surface Decarburization

"The decarburization of the surface of heavily strained ropes is a question that has occupied us here for many years. Without doubt it is right that by a great surface decarburization the durability of the wire and by that the durability of the rope itself will be reduced. Hereon numerous results of American, English and German testing laboratories are at hand. Our comparison tests in our mills which have been made comprehensively corroborated these results. It is likewise right that the influence of the surface decarburization, as far as it does not exceed an admissible extent, considerably remains behind the influence of the construction and especially behind that of the service conditions, for instance that of the thickness of hauling and speed of hauling.

★ ★ ★

"We have noticed for several years that by unfavorable service conditions, for instance, skidding of haulage ropes on the pulley or unfavorable gliding of traction ropes, surface martensite easily comes into existence, which owing to its brittlement may lead to an early breaking of the wires. We think that the stronger appearance of martensite on the surface of the wires which was noticed in recent years, contrary to the observations which had been made earlier, traces back to the process of manufacture nowadays applied to wire rods and patented wires, too. It has led to an extensive reduction, respectively of avoid-

THE NELSON COMPANY
STANDARD OIL BLDG.. BALTIMORE 2. MD.

WOOD REELS!

10" TO 120" IN DIAMETER

SET-UP
or
KNOCKED DOWN

QUICK DELIVERIES

SPECIALIZING IN WIRE ROPE REELS AND INEXPENSIVE "ONE-TRIP" REELS FOR CABLE

Thirty years of experience in quality woodworking.

Increase- HIS METAL CUTTING POTENTIAL
Decrease- YOUR METAL CUTTING COSTS
WITH THE NEW PORTER WORK-STATION CUTTER

No matter what kind of metal you cut — wire, rods, wire rope, cable or any other kind, you can save valuable man hours in your metal cutting operations with the rugged new Porter Work-Station Cutter. Can be fastened to work station welding unit or bolted to a plank and used as a portable cutter. Available in a variety of types of cutter heads for specific requirements. Notched Shear heads for cutting wire rope or cable — Center Cut heads for cutting copper, brass, aluminum, soft steel rods or wire — Center Cut round edge for hard spring wire, etc.
Available in two sizes:
1B cuts wire and cable up to 3/8" diameter.
3B cuts wire and cable up to 9/16" diameter.

Send us sample of metal to be cut and we will advise proper type of jaws required. HKP®

WRITE FOR FREE PORTER CUTTER CATALOG
H. K. PORTER, INC. Somerville 43, Mass.

Use HEANIUM®

the NEW material that withstands hi-speed pressure of wire by the tons

HEANIUM®
IS THE BEST GUIDE
. . . TO LOW COSTS.

If guide wear is a problem in your mill . . .
try HEANIUM®

HEANY INDUSTRIAL CERAMIC CORP.
NEW HAVEN 3, CONNECTICUT

BALLOFFET VIANNEY WIRE DIE CO., Inc.

All sizes from .114" down to .0003" in stock from New York.

Manufacturers of
Quality diamond dies since 1870

BALLOFFET VIANNEY WIRE DIE CO., Inc.
6823 ADAMS ST., GUTTENBERG, N. J.
Tel: Union 3-3393

ance of the surface decarburization, while the working method earlier used, for instance, the so-called dip patenting, too—the coils will be subjected to a long heating in the muffle furnace by the latter method—led to a greater decarburization of the surface which at unfavorable wear merely gave rise to abrasion but not to the formation of surface martensite, as the prerequisite for this—high carbon content on the surface—did not exist.

★ ★ ★

2. Manganese Content

"We are of the same opinion about the influence of the manganese content on the conversion at patenting as the mills questioned by you. We should like to know only whether by the increase of manganese from 0.5 - 0.7 to approximately 1 per cent if the resistance to wear will be essentially improved.

★ ★ ★

3. "Embrittleness at Hot Galvanizing.

"The frequently noticed diminution of torsions of steel wire at hot galvanizing has led years ago to the start of exact tests. These researches were made in those days in collaboration with us at the research institute of the Vereinigte Stahlwerke A.G. in Dortmund and published in 'Stahl & Eisen' 51 (1931) P. 1585/90.

★ ★ ★

"The decrease of number of torsions at hot galvanizing, i.e., embrittlement, too, depends according to those researches on a large scale on the tensile stress at drawing after the last patenting. To obtain more torsions at hot galvanized condition, therefore, distortions over 75 per cent, better 80 per cent, are suitable."

Wire Marking

Type SM MARKER

FOR USE ON C.V.'S, PLASTIC EXTRUDERS, REGULAR INSULATORS, COILERS

- For Hot or Cold horizontal marking at the extruders or as a separate operation.
- Does not require cleaning other than for color change.
- Eliminates flat wire and also ink evaporation.
- Flat, concave or special wheels.
- Accommodated diameters of from .010" thru 9.00".

In the marking of extruded material there are BIG advantages in ONE single source of supply.

1. Know-How
2. Inks
3. Wheels
4. Machines

GEM GRAVURE CO.
WEST HANOVER, MASS.
Tel.: Rockland, Mass. - TRiangle 7-0456

Crucible Steel Opens Denver Warehouse and Office

Crucible Steel Company of America opened its new offices and warehouse at 63rd Ave. and

WANT GOOD WIRE? THEN USE "THE BEST" DIES!

Only top-quality DIAMONDS are used by WAYNE. This, plus perfection in workmanship, is responsible for the fine reputation of

WAYNE WIRE DRAWING DIES

Satisfactory DIAMOND DIES can only be made by those who have experience, skill and knowledge. WAYNE has all of these. Users have called WAYNE DIES "the best."

WAYNE WIRE DIE CO., 200 Pennsylvania Ave., Hillside, N. J. Telephone: Elizabeth 2-2456

DIAMOND RECLAMATION

★ ★ ★

Those "in the know" have availed themselves of our RECLAMATION SERVICES for 15 years. Due to relocation and increased facilities we can now handle additional accounts. YOUR OWN reclaimed Diamond Powder will ALWAYS be returned to you. NO substitutions will be made.

Unparalleled Returns

★ ★ ★

We know that one trial shipment to us will open your eyes. The results will astonish and please you. Why not try it ONCE? Purity GUARANTEED. Graded if requested.

★ ★ ★

INDIANA DIAMOND DUST RECLAMATION CO.

42 EAST ALEXANDRINE, DETROIT 1, MICH.
Phone: FAirmont 1-0700
RECLAMATION SERVICES ONLY.
WE DO NOT SELL DIAMOND POWDER.

Colorado Blvd., Denver 17, Colo., on March 29th with an open house for over 300 area businessmen and industrialists.

★ ★ ★

The branch will carry stocks of Crucible's high speed tool steels, stainless, alloy and other specialty steels to serve the area, under the management of **R. L. Stark.**

Steel Wire in India

The importation of wire and wire products into India more than quadrupled in the past six years, last year reaching over 73,000 tons.

★ ★ ★

Imports from the U. S. A. of wire and wire products to the Indian market were about 17% of the whole in 1950/51, but have now declined to about 1.4%. Japan accounted last year for nearly 32% of the total. French and English imports have nearly disappeared. German imports account for 10% of the total.

Industrialization goes on apace. India's plans include the further development of the steel and wire industry. In time, wood screws, machine screws, wire mesh and wire cloth, rivets, bolts, nuts, etc. will be produced. The output of wood screws has increased ninefold in five years. The government is particularly anxious to increase the production of spring wire. Telephone cable has been manufactured since 1954 by the Hindustan Cable Factory.

★ ★ ★

The largest enterprise is the Tata Iron and Steel Company, Ltd., which has some 62,000 employees. Its production in 1955/56 amounted to 813,000 tons of rolled steel, 1,178,000 tons of steel, and 1,168,000 tons of ingot iron.

★ ★ ★

The Mysore Iron and Steel Company, Ltd. in Bhadravati, which commenced production in 1923, has started the erection of a plant to manufacture stainless steel wire and wire products. This plant will cost nearly five million pounds sterling. Another new enterprise, now building, will employ about 7,000 workers, and will manufacture wire rod, among other things.

Kennecott Employees Offered Up to 25,000 for New Ideas

Employees of **Kennecott Copper Corp.** are eligible for payments of as much as $25,000 for suggestions adopted by the mining company. The new plan became effective on April 3rd and applies to all personnel in the company's Western Mining Division and its fabricating subsidiary, **Chase Brass & Copper Co.**

★ ★ ★

Charles R. Cox, president, said awards range up to $25,000 depending upon the value of the proposal. The suggestions system, Mr. Cox said, is designed to encourage employees to propose ideas for the improvement of the company's methods and working conditions so that the success of the business and individual job security will be further enhanced.

DIAMOND POWDERS
OF FIRST QUALITY ONLY

For assured quality, accurately graded diamond powders

Specify
"DANFORTH"

They will cost more than "bargain basement" powders, but will finish your dies more economically.

RECLAIMING SERVICE

We will take your waste materials and reclaim the diamond content for you, guaranteeing that it will be 99% or better pure. When returned, it will be properly graded for further use.

Ask for prices and information on our processes.

C. W. DANFORTH CO.
P. O. Box 448, Youngstown, Ohio
Established in 1912

TUNGSTEN CARBIDE WIRE DRAWING DIES
DESIGNED FOR LONG LIFE AND MAXIMUM WIRE PRODUCTION

Furnished semi-finished to within .001" to .002" of finished size at rough-drilled die prices. Require only light sizing and polishing before using. Our dies embody special design features that make for superior performance.

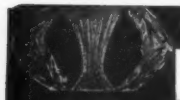
Also, a full line of carbide tooling for the Cold Heading Industry

EASTERN CARBIDE CORPORATION
NEW ROCHELLE, N. Y.

DIAMOND
and
TUNGSTEN CARBIDE
DIES
for all WIRE DRAWING purposes.
SPECIALISTS IN DIE REPAIR
WORK ON ALL TYPES OF DIES.
UNIVERSAL WIRE DIE CO.
951 Lincoln Ave., Cranford, N. J.
CRanford 6-0116

DIAMOND DIES .0006 - .120 DIAMOND POWDER
INDUSTRIAL
AJAX
SUPPLIES INC.
R.R. 4, P. O. Box 66, Fort Wayne, Ind.

NEW ENGLAND WIRE DIE CO.
7 Forsberg St., Worcester, Mass.
EXPERT RECUTTING
DIAMOND DIES, DIAMOND POWDERS
Eastern Representative of
Ajax Industrial Supplies, Inc.


DIAMOND DIES
PROFILED DIES
FINE SIZE DIES
VICTOR J. BOULIN INC.
10 FIRST STREET. PELHAM. N. Y.

Drawing Angle-Controlled
DIAMOND DIES
HOOSIER WIRE DIE, INC.
1730 Sinclair St., Ft. Wayne, Ind.

DIAMOND POWDER
Diamond Reclaiming Services
FORT WAYNE DIAMOND PRODUCTS, Inc.
2623 E. Pontiac Fort Wayne 5, Indiana

"NATDI"
A REVERSIBLE DIAMOND DIE
GREATER INITIAL PRODUCTION
MORE RECUTS — LONGER LIFE
NATIONAL WIRE DIE CO., Inc.
12 WEST 21st ST., NEW YORK 10, N. Y.

DIAMOND WIRE DRAWING DIES
and DIAMOND POWDER
INDIANA WIRE DIE COMPANY
314-324 E. Wallace St., Fort Wayne, Indiana
Phone: Harrison 4373

A Notable Wire Rod Mill in Sweden

(*Continued from page* 994)

dition to local difficulties, the mechanical connection of all the pairs would also imply a certain deterioration in quality.

★ ★ ★

The main control desk is placed to give the best possible view of the loop regulators, but because of the length of the rolling mill it is not possible to determine exactly the position of all the loops from this spot. For this reason, the control desk is fitted with built-in instruments, one for each loop, which show the deviations of the loop from the mean position. Therefore, a supervisor can rapidly check whether the basic setting of the speed of the mill motors is correct and, if necessary, make suitable adjustments. It would be a relatively simple matter to correct the position of the loops automatically by means of, for example, motor-operated rheostats, but because of the very stable conditions obtaining in the mill, this has not been thought to be necessary.

★ ★ ★

It is well-known that when planning the electrical driving equipment for a rolling-mill installation, co-operation with the rolling mill specialists is of the very greatest significance. Apparently insignificant technical details concerning the rolling process can often play a very important part when planning, for example, the control equipment. The planning of this plant was carried out by ASEA engineers in close collaboration with the engineers at Fagersta Bruks AB and the results of this co-operation have been extremely satisfactory.

Bibliography

W. Bengtsson—The New Wire Rod Rolling Mill at Fagersta, Sweden. Publ.: ASEA Journal, Vol. 28, Västeras, Sweden.

DIAMOND POWDERS
Expert Reclaiming Service
MOLINA-STRAUS
DIAMOND PRODUCTS COMPANY
11 East 48th St., New York 17, N.Y.
Tel.: MUrray Hill 9-6860

DIAMOND WIRE DRAWING DIES
DIAMOND POWDER AND COMPOUNDS
DIE RECUTTING SERVICE
CARBIDE DIES • TOOLS • PARTS
RUSCH WIRE DIE CORPORATION
CROTON-ON-HUDSON, N. Y.

CARBIDE NAIL TOOLING
for
Glader—National-Wikschtrom
Nail Machines
PITTSBURGH CARBIDE DIE CO.
Monongahela, Penna. BLackburn 8-6959

DIAMOND CARBIDE
DIES
KELLY
WIRE DIE CORPORATION
19 W. 34th St. New York

DIAMOND DIES
.008"s to .102"
For many years . . .
Outstanding in quality,
workmanship and service.
FORT WAYNE WIRE DIE, INC.
2625 E. Pontiac St., Fort Wayne, Ind.

DIAMOND DIES
mounted unmounted
For Precision Wire Drawing
BRENON, INC.
Experts in Fine Size Diamond Dies
R.F.D. #2, Box 400, Nixon, N. J.

CREPED PAPER
COIL OR BAR WRAPS
NATIONAL WATERPROOF PAPERS, INC.
BEVERLY 1, N. J.

FINE WIRE
RESPOOLING MACHINES
COLBOURNE
Machine Co., 21 Munro St.
Winsted, Conn.

TOOLS TALIDE DIES
WEAR PARTS
Talide Metal, the super hard tungsten carbide gives increased production, better finish, less down time and scrap on all wire mill operations.
METAL CARBIDES CORPORATION
YOUNGSTOWN 5, OHIO

WOOD REELS and SPOOLS
American Woodworking Company
1" to 60" Diameters. Send $1.00 for our catalogue of all wood products made in the U.S.A.
1674 N. Lowell Avenue
Chicago 39, Illinois

for finest quality products
start with
WEBB WIRE
Stainless • Needle • Nickel Alloy
WEBB WIRE
DIVISION OF THE CARPENTER STEEL CO.
NEW BRUNSWICK, N. J.

Wire Measuring...
PRODUCTIMETERS
Send for Catalog No. 40
Precision-built for accuracy and speed. Most complete line offered
DURANT MANUFACTURING CO.
1918 N. Buffum Street, Milwaukee 1, Wisconsin • 18 Thurbers Ave., Providence 5, R.I.

Superior Quality - Low Cost
WIRE DRAWING LUBRICANTS
Wet and Dry—All Metals
Write to
ROME SOAP MFG. COMPANY
SIXTH STREET • ROME, N. Y.

Zinc Metallizing Wire
THE PLATT BROS. & CO.
Waterbury 20, CONN.

FINE WIRE
ENAMELING OVENS
COLBOURNE
Machine Co., 21 Munro St.
Winsted, Conn.

Sunbeam STEWART
Batch and Conveyor furnaces for wire and strip
SUNBEAM CORPORATION, (Industrial Furnace Division)
4433 Ogden Avenue, Chicago 23, Illinois

EMORY
SPOOLERS AND TRAVERSES
ROBERT J. EMORY CO.
31 E. RUNYON ST., NEWARK 5, N. J.

Seymour Appointments

The Seymour Manufacturing Co., Seymour, Conn., has promoted **Howard S. Thrasher** to General Sales Manager, appointed **Adolph W. Grele** Assistant Sales Manager of its subsidiary, **The Phosphor Bronze Corp.,** and made **Philip L. Thomson** Purchasing Agent for both companies. Mr. Thomson replaces W. O. Bennett, who recently resigned.

Appoints Chemical Research Manager

W. R. Grace & Co.'s Polymer Chemical Division has announced the appointment of **Dr. Alio J. Buselli** as Manager of Chemical Research at its Clifton, N. J. laboratories.

★ ★ ★

Since 1951 Dr. Buselli had been supervisor of polymer research and development at Air Reduction Co. He holds three degrees in chemistry —a Bachelor's Degree from Scranton University, a Master's Degree from Fordham University, a Ph.D. from Cornell University.

★ ★ ★

He is a graduate of Wesleyan University with a B.A. degree in chemistry, and of the University of Wisconsin with a Ph.D. Following his graduation, he worked on the Manhattan Project as a research chemist, at the Massachusetts Institute of Technology.

★ ★ ★

He joined General Electric in October, 1945, as a research chemist in the Plastics Laboratory and was named to a supervisory position there in 1951. Since 1952 he has done marketing research and product planning work.

FOR THE BEST IN Spiral Wrap
SPECIFY "Arksafe"
ARKELL SAFETY BAG CO., 10 E. 40th St., N. Y. 16, N. Y.

Immediately Available
WIRE WORKING MACHINERY
FOURSLIDES: Baird, Nilson & Manville, Nos. 0, 1, 2, 3, 4, 5, 3-20, 4-26
U. S. Tool Co. No. 22, 28, & 33 Multislides
Sleeper & Hartley Spring Coilers Nos. 0, 1, 2, 3, 3½, 4, & 5 & Torrington W10 & W12
Vaughn Nos. 8, 10, & 12 Moto-Blocs
Waterbury No. 3 Bull Blocks, Duplex
Morgan 4 stand Wire Drawer with pointer and 100 H.P. motor drive & motor
Waterbury Nos. 1, 2, & 3 Continuous Wire Drawing Machines
PARTIAL STOCK LISTING
"The most diversified stock of machinery in the country. If it's machinery we have it."
National Machinery Exchange
130 Mott St., New York 13, N. Y.
CAnal 6-2470

CLEVELAND TRAMRAIL
Division of
THE CLEVELAND CRANE & ENGINEERING CO.
WICKLIFFE, OHIO
Leading manufacturers of
OVERHEAD MATERIALS HANDLING EQUIPMENT
for the Wire and Wire Products Industry

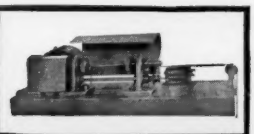
TESTING EQUIPMENT
WIRE MACHINERY
PAYOFFPAK
Federal Manufacturing Co.
Wallingford, Conn.

STRAND-BUFFALO CORP.
No. Tonawanda, N. Y. (near Buffalo)
REELS
WOOD and PLYWOOD
Manufactured to Your Specifications

DEPENDABLE WIRE EQUIPMENT
FINE WIRE DRAWING MACHINES
RESPOOLING MACHINES
WIRE PLATING EQUIPMENT
SCREW TYPE TRAVERSES
HODGE BROS. MACHINE SHOP
2 HAVELL ST. • OSSINING, N. Y.

METALLIZING WIRE
PURE ZINC and CADMIUM
Other Fine Bare Wires
Manufactured to Your Specifications
IMMEDIATE DELIVERY
STAMFORD PROCESSING CO.
10-24 S. Water St., Peekskill, N. Y.

WIRE DRAWING MACHINERY AND EQUIPMENT
Rod Frames — 16" Frames, 8" Frames — Take-Up Frame, Wire — Pointers — Puller Tongs — General and heat resisting alloy castings for wire mill use.
Circulars on Request
E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON, N. J.

MODEL T-3
TORSION TESTER FOR WIRE

SCOTT TESTERS INC. 55 BLACKSTONE ST. PROVIDENCE 1, R.I.

Engineering and Professional Services

LANCASTER, ALLWINE & ROMMEL

REGISTERED PATENT ATTORNEYS

Suite 438, 815—15th St., N. W.

Washington 5, D. C.

•

Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request.

CONSULTING ENGINEERS

Specializing in Wire Forming Machinery: Preformed Staple Making Machines, Special Stitcher Heads, Modified or New Design.

UNIT-SERVICE ENGINEERS

4049 W. Eastwood

Chicago 30, Illinois

LINE—GORCY

mechanical

wire rod descalers

FISHER ASSOCIATES

122 East 42nd St. New York 17, N. Y.

Engineered Application of Heat in Continuous Processing Systems

INDUSTRIAL OVENS, INC.

13825 TRISKETT ROAD

CLEVELAND 11, OHIO

CONSULTING WIRE MILL ENGINEER

Specializing in Wire Mill Machinery, Plant Layout and Production Techniques.

CLARENCE S. ARMS

Sleeper & Hartley, Incorporated

P.O. Box 1249 • Worcester, Mass.

FINE WIRE 8-SPINDLE TAKE-UPS

COLBOURNE

Machine Co., 21 Munro St.

Winsted, Conn.

Heavy Duty, Precision . . . . . .

- **WIRE RE-WINDING MACHINES**
- **WIRE DRAWING FRAMES**
  —with constant tension
- **COIL and ARMATURE MACHINES—all types**

Include specifications when inquiring.

INDUSTRIAL WINDING MACHINERY CO.

SUITE 3410 - 120 WALL ST., NEW YORK 5, N. Y.

WHitehall 3-1754

FOR SALE

SINGLE STRAND ANNEALING FURNACE AND TAKEUP

New 12′ 2 Zone Gas Fired Single Strand Annealing Furnace with 2 Pyrometer controls . . . Automatic Gas Valves . . . Inconel Tubing for Atmospheric Gas . . . Max. Temperature 2200 Degrees . . . Water Cooling Unit . . . 8 Head Motorized Spooler with Gear Reduction Unit . . . Max. Spool Capacity 500 lbs. each . . . Adjustable Motorized Traverse . . . 1 Ton Overhead Budjet Hoist.

NESOR ALLOY PRODUCTS CO.

282 Halsey Street, Newark, N. J.

SALES MANAGER - Wire Drawing Machines

Remunerative and challenging opportunity to well qualified specialist in the wire drawing field. Will handle national sales of imported wire drawing machines. Only experienced sales engineer on wire drawing application—both sales and service—need apply. Please state full qualifications and salary range in first letter. Reply to Box 917

WIRE AND WIRE PRODUCTS

Ten years experience sales management and other phases management insulated wire and cable business, desire position as sales manager or general manager.

Reply to Box 918

WIRE AND WIRE PRODUCTS

FOR SALE

Jennings TE-1 Extruder Unit (2-½") Excellent Condition. Fine Spare or can be Converted to Complete Extruding Machine.

Reply to Box 916

WIRE & WIRE PRODUCTS

453 Main Street Stamford, Conn.

Appointed Divisional Sales Manager

Alan Moyer of **Reynolds Metals Company** has been named Milwaukee Divisional Sales Manager, industrial sales.

★ ★ ★

His promotion was announced by **George F. Voris**, Regional Sales Manager, industrial sales, in the company's Chicago regional office.

★ ★ ★

Mr. Moyer joined Reynolds in 1945 in Boston as a sales representative, after attending the Massachusetts Institute of Technology. In 1951 he was transferred to Louisville and promoted to the post of assitant distributor coordinator.

To Manage G.E.'s Product Development Lab

L. S. Moody has been appointed manager of the New Product Development Laboratory of **General Electric's** chemical development department in Pittsfield, Mass., according to an announcement made by department manager **A. E. Schubert.**

★ ★ ★

In this capacity, Dr. Moody will have responsibility for conducting research, product development, product design and application development programs for the department.

Symposium on Properties, Tests, and Performance of Electrodeposited Metallic Coatings

The extensive use of plated metals, particularly electrodeposited, makes this Symposium of considerable interest to both producers and consumers of electroplated material. Recent advances in the field have broadened the use of electrodeposited metals so that they now may be found on products for the home, industry, building trade and the military.

★ ★ ★

The volume is extensively illustrated and contains comprehensive tabular data. Prepared under the auspices of ASTM Committee B-8 on Electrodeposited Metallic Coatings, the Symposium contains nine significant papers.

★ ★ ★

Copies of this book, interesting to engineers concerned with plating problems, may be obtained from the **American Society for Testing Materials,** 1916 Race Street, Philadelphia 3, Pa., at $3.00 each.

Index to Advertisers

A

Acrometal Products, Inc. ..... 1033 and 1044
Ajax Electric Company 1031
Ajax Industrial Supplies, Inc. 1056
Aluminum Company of America 958
American Insulating Machinery Company 1040
American Laubscher Corporation 1027
American Woodworking Company 1057
Apex Alkali Products Company, Inc. 968
Apco Mossberg Company 1022
Arkell Safety Bag Company 1057
Arms, Clarence S. 1058

B

Bakelite Company Div. of Union Carbide Corporation 976-977
Balloffet-Vianney Wire Die Co., Inc. 1054
Bartell Machine-Tool Corp. 1034
Beard Machine Company 1045
Boulin Inc., Victor J. 1056
Brenon, Inc. 1056
Breitenbach, Wilhem, Maschinenfabrik and Eisengieberei GMBH 980
Bridge Manufacturing Company 979
Burdwood, Inc., Howard A. 1046

C

Carl Mayer Corp., The 1044
Carpenter Steel Co.-Webb Wire Div. 1057
Carris Reels, Inc. 1019
Cedar West Tool Company, Inc. 963
Clark Manufacturing Company, J. L. 962
Cleveland Tramrail Division of Cleveland Crane & Engineering Co. 1057
Colbourne Machine Co. 1056-1057-1058
Colorado Fuel & Iron Corporation, Wickwire Wire Div. 960-961
Continental Can Company ..... Inside Front Cover
Continental Steel Corporation 1023
Cook Manufacturing Co. 970
Coulter & McKenzie Machine Co., Inc., The 1009

D

Danforth Company, C. W. 1055
Davis Standard Division of Franklin Research Corporation 968-B
Durant Manufacturing Co. 1057
Durkee Manufacturing Co. 1051
Dykrex Corporation of America, Roos Tool & Mfg. Division 1043

E

Eastern Carbide Corporation 1055
Edmands Co., The 1047
Electric Furnace Company, The ..... Back Cover
Elgin National Watch Co., Abrasives Division 1004
Emory Company, Robert J. 1057
Engis Equipment Co. 1042
Entwistle Manufacturing Corporation 981
E V G-Maschinen & Stahl, A G-Richard E. Kleinnans 972

F

Federal Manufacturing Co. 1057
Fenn Manufacturing Company, The 1021
Fisher Associates 1058
Fort Wayne Diamond Products, Inc. 1056
Fort Wayne Wire Die, Inc. 1056

G

Gem Gravure Co., The 1054
Gillies Co., Inc., Duncan M. 1051
Glader Machine Works, Wm. 1026
Godderidge Ste. 973

H

Haskell-Dawes Machine Co., Inc. 1048
Heany Industrial Ceramic Corp. 1054
Herborn, Maschinenfabrik 985
Hodge Bros. Machine Shop 1057
Hoosier Wire Die, Inc. 1056
Hubbard Spool Company 955

I

Indiana Wire Die Company 1056
Indiana Diamond Dust Reclaiming Co. 1055
Industrial Ovens, Inc. 1058
Industrial Winding Machinery Co. 1058

J

Jarke Manufacturing Company 1045
Jones & Laughlin Steel Corporation 974

K

Kelly Wire Die Corporation 1056
Keystone Steel & Wire Company 984-A

L

Lancaster, Allwine & Rommel 1058
Larmuth (1947) Ltd. 1046
Lewis Machine Company, The 1036

M

Magnuson Products Corporation 1052
Malin & Company, The 1052
Maschinenfabrik K. A. Niehaus 1028
Metal Carbides Corporation 1057
Metallurgical Products Dept. of General Electric Company 964
Mettler Machine Tool, Inc. 982
Micro Products Co. 1018
Miller Company, Inc., R. H. 990
Molina-Straus Diamond Products Company 1056
Monsanto Chemical Company ..... 1000 A-B-C- & D
Montgomery Company, The 1051
Morgan Construction Company 956
Morgardshammers Mek Verkstads A. B. 984
Mossberg Pressed Steel Corporation 1028

N

National Machinery Exchange 1057
National Research Company 1053
National Standard Company 978
National Waterproof Papers, Inc. 1056
National Wire Die Co., Inc. 1056
Naugatuck Chemical Division of U.S. Rubber Company 983
Nelson Company, The 1053
New England Butt Co. 1050
New England Wire Die Co. 1056
Nichols Wire & Aluminum Co. 965
Nopco Chemical Company 954
Nilson Machine Company, A. K. 1029
Norton Company 1032

P

Pacific Coast Borax Company Division, United States Borax & Chemical Corporation 1041
Parkin Chemical Co., The 1049
Patterson Machine Co., George C. 1049
Peschel Electronics Co., The 1047
Pittsburgh Carbide Die Co. 1056
Plandex Corporation 1043
Platt Bros. & Co., The 1057
Plymouth Cordage Company 1030
Porter Company Inc., H. K., Riverside-Alloy Metal Division 1020
Porter, Inc., H. K. 1053
Pourtier Pere et Fils 1038

R

Reicher, Paul—H. A. Schlatter, Ltd. 1038
Republic Steel Corporation 957
Riverside-Alloy Metal Division, H. K. Porter Company, Inc., The 1020
Robinson Company, M. W. 1042
Roebling's Sons Corp., John A. 968-A
Rome Soap Manufacturing Co. 1057
Royle & Sons, John 1015
Rusch Wire Die Corporation 1056

S

Scott Testers, Inc. 1057
Scudder Foundry & Machine Co., E. J. 1057
Shawinigan Resins Corporation 971
Sjogren Tool & Machine Co., Inc. 1039
Sleeper & Hartley, Inc. 987
Stamford Processing Co. 1057
Standard Industrial Compounds Co., Inc. 953
Standard Mill Supply Company 1052
Strand-Buffalo Corp. 1057
Sunbeam Corporation, Industrial Furnace Div. 1057
Superior Tool & Manufacturing Co. 1052
Swift & Company 969
Syncro Machine Company 984-B

T

Torrington Manufacturing Co., The 975
Twitchell Inc., E. W. 1025

U

Unit Service Engineers 1058
United States Borax & Chemical Corporation, Pacific Coast Borax Company Division 1041
U.S. Industrial Chemicals Co. Div. of National Distillers & Chemical Corporation 966
U.S. Rubber Company, Naugatuck Chemical Division 983
Universal Wire Die Co. 1056

V

Vascoloy-Ramet Corporation 988
Vaughn Machinery Co., The ..... Front Cover

W

Wardwell Braiding Machine Co. 1024
Waterbury-Farrel Foundry & Machine Co., The 959
Watson Machine Company, The ..... Inside Back Cover
Wayne Wire Die Co. 1054
Webb Wire Div., Carpenter Steel Co. 1057
Westebbe & Weispfennig 1053
Wickwire Wire Div., Colorado Fuel & Iron Corporation 960-961
Wilson, Lee, Engineering Company, Inc. 967
Winstrom, Inc. 1037
Wire & Textile Machinery, Inc. 1050
Wire Tool Division, Bridgeport Jig Boring Company 1048

Y

Youngstown Sheet & Tube Company, The 986

WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.
Only advertisers who have contracted for six or more insertions are listed in this section.

ABRASIVES—
Amplex Corporation, West Hartford, Conn.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Norton Co., Worcester, Mass.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ADJUSTABLE SPEED DRIVES—
The Louis Allis Company, Milwaukee, Wisc.

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

BAKERS—
(See OVENS—Rod Bakers)

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg C., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

BORAX—Wire Drawing
United States Borax & Chemical Corp., Pacific Coast Borax Co. Div., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

CABLE FILLERS—Paper
Plymouth Cordage Company, Plymouth, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

CAPSTANS—for Wire (also Caterpillar Types)
Bartell Machine-Tool Corporation, Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Entwistle Manufacturing Corporation, Providence, R. I.
Litzler, C. A. Co., Inc., Cleveland, Ohio

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CATALYSTS—For Fume Elimination
Oxy-Catalyst, Inc., Industrial Div., Wayne, Pa.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Magnuson Products Corporation, Brooklyn, N.Y.
Miller, R. H., Co., Inc., Homer, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Rome Soap Manufacturing Co., Rome, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

CLEANING & PICKLING EQUIP.—
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee Engr. Co., Cleveland, Ohio

CLOTH—WIRE, All Metals
Wickwire Bros., Cortland, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N.Y.
Miller, R. H., Co., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
United States Borax & Chemical Corp., Div. Pacific Coast Borax Co., New York, N. Y.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Amplex Corporation, West Hartford, Conn.
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago
Rusch Wire Die Corporation, Croton-on-Hudson, N. Y.

COMPOUNDS—Extrusion for Wire
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Products Corporation, New York, N. Y.

COMPOUNDS—For Improving Drawing & Extrusion
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Phosphate Coating
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corporation, Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.
Rome Soap Manufacturing Co., Rome, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N.Y.
Standard Industrial Compounds Co., Frankfort, Ill.

COMPOUNDS—Vinyl
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N.Y.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Rome Soap Manufacturing Co., Rome, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
Swift & Company, Chicago, Ill.
United States Borax & Chemical Corp., Pacific Coast Borax Co. Div., New York, N. Y.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

CONTAINERS—Wire Packaging
(See DRUMS—Wire Packaging)

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

COUNTERS—
(See MACHINERY—Measuring Wire and Cable)

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Metallurgical Products Dept. of General Electric Co., Detroit
Vascoloy-Ramet Corp., Waukegan, Ill.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Somerville, Mass.
Robinson, M. W. Co., Rockfall, Conn.

DIAMONDS—Industrial
Amplex Corporation, West Hartford, Conn.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Molina-Straus Diamond Products Co., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS
Amplex Corporation, West Hartford, Conn.
Danforth, The C. W. Co., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Molina-Straus Diamond Products Co., New York, N. Y.
National Research Company, St. Clair Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING—
Danforth, The C. W. Co., Youngstown, Ohio
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Diamond Dust Reclaiming Co., Detroit, Michigan
Kelly Wire Die Corp., New York, N. Y.
National Research Co., St. Clair Shores, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Amplex Corporation, West Hartford, Conn.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Molina-Straus Diamond Products Co., New York, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Metallurgical Products Dept. of General Electric Co., Detroit
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Cold Heading
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
Metallurgical Products Dept. of General Electric Co., Detroit
Vascoloy-Ramet Corp., Waukegan, Ill.

DIES—Diamond
Ajax Industrial Supplies, Inc., Ft. Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Ft. Wayne Wire Die Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIES DIAMOND—Drawing Angle Controlled
Hoosier Wire Die, Inc., Ft. Wayne, Ind.

DIES DIAMOND—Reversible
National Wire Die Co., Inc., New York, N. Y.

DIES—Extrusion
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Kelloy Corporation, New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
Metallurgical Products Dept. of General Electric Co., Detroit
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Polishing, Asbestos Wire
Beard Machine Co., York, Pa.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Metallurgical Products Dept. of General Electric Co., Detroit
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.

DIES—Swaging
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Hoosier Wire Die., Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Metallurgical Products Dept. of General Electric Co., Detroit
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., Waukegan, Ill.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRIVES—Electric, Adustable Speed
Allis, The Louis Co., Milwaukee, Wisc.

DRUMS—Wire Packaging
Continental Can Company, Van Wert, Ohio
Hubbard Spool Company, Garrett, Ind.

DRUMS & TRAVERSES—For Cable Reels
Hubbard Spool Co., Garrett, Ind.
Republic Steel Corp., Pressed Steel Div., Cleveland, Ohio

DRYING EQUIPMENT—
Carl Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

ELECTRONIC PROCESS CONTROL DEVICES
Winstrom, Northampton, Mass.

ENGINEERS—Consulting
Bartell Machine-Tool Corporation, Rome, N. Y.
Wire Mill—Clarence S. Arms, Worcester, Mass.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FREQUENCY CHANGERS—
The Louis Allis Company, Milwaukee, Wisc.

FURNACES—Brazing
Ajax Electric Company, Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Sunbeam Corporation, (Industrial Furnace Division), Chicago, Illinois

FURNACES—Galvanizing Equipment
Ajax Electric Company, Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Sunbeam Corporation, (Industrial Furnace Division), Chicago, Illinois
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Company, Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Sunbeam Corporation, (Industrial Furnace Division), Chicago, Illinois
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Pot (Oil, Gas, Electric)
Ajax Electric Company, Philadelphia, Pa.
Sunbeam Corporation, (Industrial Furnace Division), Chicago, Illinois

FURNACES—Resisting Heating, Strand
Electric Furnace Company, Salem, Ohio
Sunbeam Corporation, (Industrial Furnace Division), Chicago, Illinois

FURNACES—Salt Bath
Ajax Electric Company, Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio

FURNACES—Strand Annealing
Electric Furnace Company, Salem, Ohio
Sunbeam Corporation, (Industrial Furnace Division), Chicago, Illinois

GAUGES—Electronic, for Springs
Winstrom, Northampton, Mass.

GAUGES—Wire Diameter, Continuous
Industrial Gauges Corporation, West Englewood, N. J.

GALVANIZING EQUIPMENT—(See MACHINERY—Galvanizing Wire)

GEARMOTORS—
The Louis Allis Company, Milwaukee, Wisc.

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

GUIDES—For Wire
Heany Industrial Ceramic Corp., New Haven, Conn.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INKS—Printing, for Insulated Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.

INSULATING MATERIALS—
Bakelite Company Div. of Union Carbon & Carbide Corp., New York, N. Y.
duPont de Nemours Co., (Inc.), E. I., Polychemical Dept., Wilmington, Delaware
General Electric Company, Alkanex Wire Enamel Dept., Schenectady, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Plymouth Cordage Company, Plymouth, Mass.
Shawinigan Resins Corporation, Springfield, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Products Corporation, New York, N. Y.
United States Rubber Company, Naugatuck Chemical Division, New York, N. Y.

INSULATING MATERIALS—Paper (For Electric Wire Cable)
Plymouth Cordage Company, Plymouth, Mass.

LACQUERING SYSTEMS—See MACH.—Lacquering Electric Wire

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., The. Philadelphia and Bellefonte, Pa.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corporation, Brooklyn, N.Y.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Company, Harrison, N. J.
Rome Soap Mfg. Co., Rome, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Wm., Machine Works, Chicago, Ill.
Wafios, Maschinenfabrik, Reutlingen, Wurtt, Germany

MACHINERY—Bobbin Winders
Cedar West Tool Company, Inc., New York, N. Y.

MACHINERY—Braiding
New England Butt Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Capstans and Machinery—Winding Wire)

MACHINERY—Centerless Grinding & Polishing
American Laubscher Corporation, New York, N. Y.

MACHINERY—Chain Making
Nilson, A. H. Machine Co., Shelton, Conn.
Wafios Maschinenfabrik, Reutlingen, Wurtt, Germany

MACHINERY—Closing Rope
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Herborn, Maschinenfabrik, Herborn, Germany
Morgardshammer Mek Verstads A. B., Morgardshammer, Sweden.
National Mach'y Exch (Used), New York
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Company, Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Patterson Machine, Geo. C., Co., Cleveland, Ohio

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.
Herborn, Maschinenfabrik, Herborn, Germany

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Firth Sterling, Inc., Pittsburgh, Pa.
Metallurgical Products Dept. of General Electric Co., Detroit
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Litzler, C. A., Co., Inc., Cleveland, Ohio
Michigan Oven, Company, Detroit, Mich.

MACHINERY—Extruding
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Royle, John, & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming Wire
Nilson, A. H. Machine Co., Shelton, Conn.
Wafios Maschinenfabrik, Reutlingen, Wurtt, Germany

MACHINERY—Galvanizing Wire
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Mfg. Co., Wallingford, Conn.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
American Insulating Mach'y Co., Phila., Pa.
Beard Machine Co., York, Pa.
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Litzler, C. A., Co., Inc., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.
New England Butt Co., Providence, R. I.
Pourtier Pere et Fils, Romainville (Seine), France
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Labeling Electric Wire
Dewyer, Inc., Libertyville, Ill.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia
Cook Mfg. Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, O.
Michigan Oven Company, Detroit, Mich.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Cedar West Tool Company, Inc., New York, N. Y.
E. V. G., Richard Kleinhans, New York, N. Y.
Maschinen & Stahl A. G., c/o Richard Kleinhans, Zurich, Switzerland
Wafios Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Durant Mfg Co., Milwaukee, Wis.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N. Y.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Packaging Wire
Coulter & McKenzie Machine Co., Bridgeport, Conn.

MACHINERY—Pin Making

MACHINERY—Plating
Hodge Bros. Machine Shop, Ossining, N. Y.
Universal Industrial Equipment Co., Secaucus, N. J.

MACHINERY—Pointing
Herborn, Maschinenfabrik, Herborn, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York,
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Polishing Asbestos Wire
Beard Machine Co., York, Pa.

MACHINERY—Printing on Electric Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.
Gillies, Duncan M. Co., Inc., Boylston, Mass.

MACHINERY—Re-Spooling
Bartell Machine-Tool Corporation, Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Emory Company, Robert J., Newark, N. J.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Herborn, Maschinenfabrik, Herborn, Germany
Hodge Bros. Machine Shop, Ossining, N. Y.
Industrial Winding Machinery Co., New York, N. Y.
National Mach'y Exch. (Used), New York N. Y.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

MACHINERY—Rod Mill
Herborn, Maschinenfabrik, Herborn, Germany
Morgan Construction Co., Worcester, Mass.

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Litzler, C. A., Co., Inc., Cleveland, Ohio
Royle, John & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Serving
Pourtier Pere et Fils, Romainville (Seine), France
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Spark Testing
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Peschel Electronics, Inc., New Rochelle, N. Y.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Staple
Nilson, A. H. Machine Co., Shelton, Conn.
Wafios, Maschinenfabrik, Reutlingen, Wurtt., Germany

MACHINERY—Straightening & Cutting
Breitenbach, Wilhelm, Unna, Germany
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Patterson Machine, Geo. C., Co., Cleveland, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Stranding
Bartell Machine-Tool Corporation, Rome, N. Y.
Godderidge Ste., Houilles, (Seine-et-Oise), France
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Superior Tool & Manufacturing Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Stripping Electric Wire & Cable
Burdwood, Howard A., Inc., Portland, Maine

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
American Insulating Mach'y Co., Phila., Pa.
Breitenbach, Wilhelm, Unna, Germany
Colbourne Machine Company, Winsted, Conn.
Davis-Standard Division of Franklin Research Corporation, Mystic, Conn.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
Litzler, C. A., Co., Inc., Cleveland, Ohio
Pourtier Pere et Fils, Romainville (Seine) France
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Pourtier Pere et Fils, Romainville (Seine), France
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing Magnet Wire Coatings for Pin Holes
Federal Mfg. Co., Wallingford, Conn.
Peschel Electronics, Inc., New Rochelle, N. Y.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Bartell Machine-Tool Corporation, Rome, N. Y.
Cook Manufacturing Co., The, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Universal Industrial Equipment Co., Secaucus, N. J.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—Welded Wire Mesh
E. V. G., Richard Kleinhans, New York, N. Y.
Maschinen & Stahl A. G., c/o Richard Kleinhans, Zurich, Switzerland

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot and Machinery—Welding Wire Fabrics)

MACHINERY—Winding Wire
Emory Company, Robert J., Newark, N. J.
Federal Manufacturing Company, Wallingford, Conn.
Industrial Winding Machinery Co., New York, N. Y.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
Breitenbach, Wilhelm, Unna, Germany
Cook Manufacturing Co., The, Paterson, N. J.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Federal Mfg. Co., Wallingford, Conn.
Herborn, Maschinenfabrik, Herborn, Germany
Hodge Bros. Machine Shop, Ossining, N. Y.
Morgan Construction Co., Worcester, Mass.
Morgardshammer Mek Verstads AB, Morgardshammer, Sweden
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Superior Tool & Manufacturing Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

MACHINERY—Wire Forming
National Mach'y Exch. (Used), New York, N. Y.
Nilson, A. H. Machine Co., Shelton, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Larmuth (1947) Ltd., Swinton, England
Terkelsen Machine Co., Boston, Mass.

MANDRELS—Extrusion
Bartell Machine-Tool Corporation, Rome, N. Y.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MOTORS—Electric, A.C. & D.C.
The Louis Allis Company, Milwaukee, Wisc.

NAIL TOOLING—Tungsten Carbide
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Brothers, Inc., Cortland, N. Y.

NIPPERS—Wire Cutting
Robinson, M. W. Co., Rockfall, Conn.

NOZZLES—For Extruding Machines
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

OVENS—Cable Lacquering and Enameling
American Insulating Mach'y Co., Phila., Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Colbourne Machine Company, Winsted, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
Litzler, C. A., Co., Inc., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

OVENS—Rod Bakers
Carl Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Litzler, C. A., Co., Inc., Cleveland, Ohio

PAILS—Packaging
(See Drums—Wire Packaging)

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAPER—Creped Wrapping
Arkell Safety Bag Company, New York, N. Y.
National Waterproof Papers, Inc., Beverly, N. J.
Rinkle, Krinkle Paper Co., Inc., Boston, Mass.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Arkell Safety Bag Company, New York, N. Y.
National Waterproof Papers, Inc., Beverly, N. J.
Rinkle, Krinkle Paper Co., Inc., Boston, Mass.
Terkelsen Machine Co., Boston, Mass.

PAPER—Insulating
Plymouth Cordage Company, Plymouth, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

PATENT—ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PLASTICIZERS—
Monsanto Chemical Company, Plastics Division, St. Louis, Mo.
Pittsburgh Coke & Chemical Co., Pittsburgh, Pa.

PLASTICS COMPOUNDING—Custom
Plandex Corporation, Downingtown, Pa.

PLASTICS—for Wire Insulation
Bakelite Company Div. of Union Carbon & Carbide Corporation, New York, N. Y.
duPont de Nemours Co., (Inc.), E. I., Polychemical Dept., Wilmington, Delaware
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Plandex Corporation, Downingtown, Pa.
Shawinigan Resins Corporation, Springfield, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Products Corporation, New York, N. Y.
United States Rubber Company, Naugatuck Chemical Division, New York, N. Y.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRINTING WHEELS—for Electric Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gillies, Duncan M. Co., Inc. Boylston, Mass.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

PUMPS—Molten Metal
Fisher Associates, New York, N. Y.

RACKS—Wire Storage
Jarke Manufacturing Co., Chicago, Illinois

REEL AND TENSION STANDS—
Industrial Ovens, Inc., Cleveland, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Garrett, Ind.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Garrett, Ind.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Cleveland, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., William, Westport, Mass.
Strand-Buffalo Corporation, North Tonawanda, N. Y.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., William, Westport, Mass.
Nelson Company, The, Baltimore, Md.
Strand-Buffalo Corporation, North Tonawanda, N. Y.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Garrett, Ind.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Cleveland, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., William, Westport, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Nilson, A. H. Machine Co., Shelton, Conn.
Republic Steel Corp., Pressed Steel Div., Cleveland, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Wood
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., William, Westport, Mass.
Nelson Company, The, Baltimore, Md.
Strand-Buffalo Corporation, North Tonawanda, N. Y.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Aluminum
Aluminum Company of America, Pittsburgh, Pa.

RODS—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Aluminum Company of America, Pittsburgh, Pa.
Platt Bros. & Co., The, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Seymour Mfg. Co., Phosphor Bronze Div., Seymour, Conn.

RODS—Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—RUST Preventing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—RUST Preventing)

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SPOOLS—Plastic
Hubbard Spool Company, Garrett, Indiana
Standard Mill Supply, Co., Pawtucket, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STOCK STORAGE SYSTEMS
Jarke Manufacturing Co., Chicago, Illinois

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

SWITCHES—Electronic Sensing
Winstrom, Northampton, Mass.

TABLES—Press Feeding
Jarke Manufacturing Co., Chicago, Illinois

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TESTERS—INSULATION
(See MACHINERY—Spark Testers)

TESTING EQUIPMENT
(See MACHINERY Testing, Physical and Diameter Testing)

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper Silver and False Gold Coated, etc.
(See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TOOLS—Wire Cutting
Porter, H. K., Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Adjustable Speed Drives)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
Bartell Machine-Tool Corporation, Rome, N. Y.
Emory Company, Robert J., Newark, N. J.
Hodge Bros. Machine Shop, Ossining, N. Y.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

VARNISHES & LACQUERS—for Electric Wire
General Electric Company, Alkanex Wire Enamel Dept., Schenectady, N. Y.
Shawinigan Resins Corporation, Springfield, Mass.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila, Pa.
Litzler, C. A., Co., Inc., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt and Welding Wire Fabrics
Eisler Engineering Corp., Newark, N. J.
Micro Products Co., Chicago, Ill.
Strecker, August, K.G., Limburg/Lahn, W. Germany

WHEELS—for Printing on Electric Wire
Gem Gravure Company, West Hanover, Mass.

WIRE—Aluminum
Aluminum Company of America, Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., The, Cleveland, Ohio
National Standard Company, Niles, Mich.
Scovill Mfg. Co., Waterbury, Conn.
United Wire & Supply Corporation, Providence, R. I.

WIRE—Ball
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Barbed
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

WIRE—Brass and Bronze
Chase Brass & Copper Co., Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Seymour Mfg. Company, Phosphor Bronze Div., Seymour, Conn.
United Wire & Supply Corporation, Providence, R. I.

WIRE—Cadmium
Stamford Processing Co., Peekskill, N. Y.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Scovill Mfg. Co., Waterbury, Conn.
Sheffield Steel Corp., Kansas City, Mo.
United Wire & Supply Corporation, Providence, R. I.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
United Wire & Supply Corporation, Providence, R. I.

WIRE—For Electrical Conductors
United Wire & Supply Corporation, Providence, R. I.

WIRE—Flat, Fine
Montgomery Co., The, Windsor Locks, Conn.
National Standard Company, Niles, Mich.
United Wire & Supply Corporation, Providence, R. I.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Galvanized
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
National Standard Company, Niles, Mich.
Roebling's, John A. Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—High Carbon
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Manufacturers
Aluminum Company of America, Pittsburgh, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
National Lock Washer Company, The, Newark N. J.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Porter Company, Inc., H. K., Riverside Alloy Metal Division, Prospect Park, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Scovill Mfg. Co., Waterbury, Conn.
Seymour Mfg. Company, Phosphor Bronze Div., Seymour, Conn.
Sheffield Steel Corp., Kansas City, Mo.
United Wire & Supply Corporation, Providence, R. I.
U. S. Steel Corp., N. Y., N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Metalizing
Stamford Processing Co., Peekskill, N. Y.

WIRE—Music
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., The, Cleveland, Ohio
National Standard Company, Niles, Mich.
Worcester Wire Works Div., National-Standard Company, Worcester, Mass.

WIRE—Needle
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Nickel Alloy
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., The, Cleveland, Ohio
Porter Company, Inc., H. K., Riverside Alloy Metal Division, Prospect Park, Pa.
Seymour Mfg. Co., Phosphor Bronze Div., Seymour, Conn.
United Wire & Supply Corporation, Providence, R. I.

WIRE—Oil Tempered
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Special Shapes
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
Porter Company, Inc., H. K., Riverside Alloy Metal Division, Prospect Park, Pa.
United Wire & Supply Corporation, Providence, R. I.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Spring
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Porter Company, Inc., H. K., Riverside Alloy Metal Division, Prospect Park, Pa.
Roebling's John A., Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
United Wire & Supply Corporation, Providence, R. I.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Crucible Steel Co. of America, Pittsburgh, Pa.
Firth Sterling, Inc., Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Steel—Also Coppered and Galvanized Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Crucible Steel Co. of America, Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester Mass.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
National Standard Company, Niles, Mich.
Pittsburgh Steel Co., Pittsburgh, Pa.
Porter Company, Inc., H. K., Riverside Alloy Metal Division, Prospect Park, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Sheffield Steel Corp., Kansas City, Mo.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
United Wire & Supply Corporation, Providence, R. I.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WOOD—for Guide, Rolls, Bushings, Wear Parts, etc.

WRAPPING PAPER—Creped
(See PAPER—Creped Wrapping)

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE AND MASTICATING MACHINERY MANUFACTURERS

WATSON

AUTOMATIC TRAVERSES

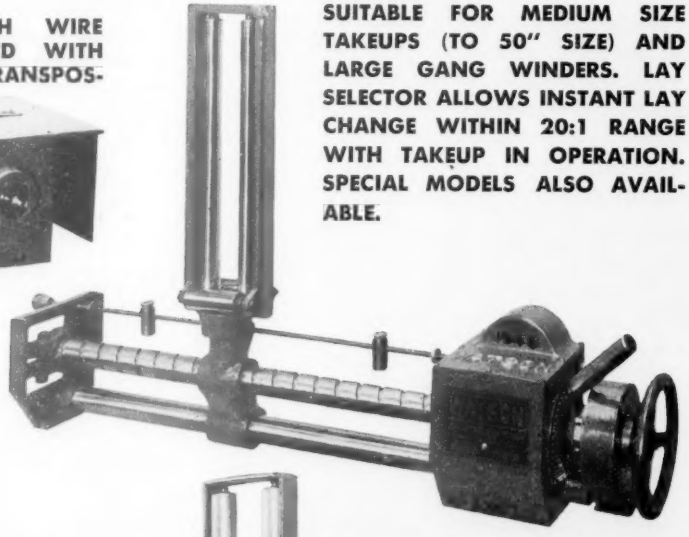
STANDARD STOCK MODELS SHOWN. SUITABLE AS REPLACEMENTS OF INADEQUATE MECHANISMS. ADAPTABLE TO APPLICATIONS WHERE A POWERFUL RECIPROCATING MOTION IS REQUIRED.

TRAVERSE "E"

CAPABLE OF FUNCTIONING AT HIGH WIRE TENSIONS AND COMMONLY FURNISHED WITH SMALL STRANDERS AND WINDERS. TRANSPOSABLE CHANGE GEARS PROVIDE FOR LAY VARIATION SETTING.

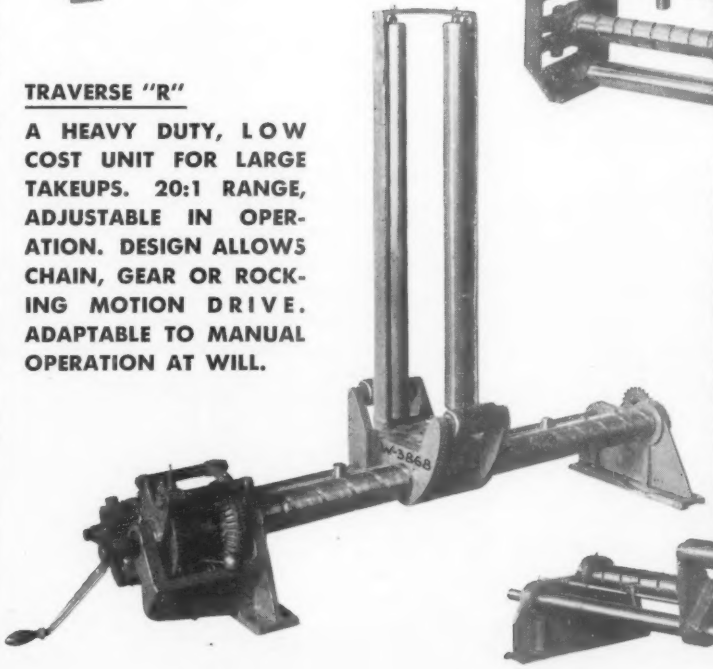
TRAVERSE "C"

SUITABLE FOR MEDIUM SIZE TAKEUPS (TO 50" SIZE) AND LARGE GANG WINDERS. LAY SELECTOR ALLOWS INSTANT LAY CHANGE WITHIN 20:1 RANGE WITH TAKEUP IN OPERATION. SPECIAL MODELS ALSO AVAILABLE.



TRAVERSE "R"

A HEAVY DUTY, LOW COST UNIT FOR LARGE TAKEUPS. 20:1 RANGE, ADJUSTABLE IN OPERATION. DESIGN ALLOWS CHAIN, GEAR OR ROCKING MOTION DRIVE. ADAPTABLE TO MANUAL OPERATION AT WILL.



TRAVERSE "W"

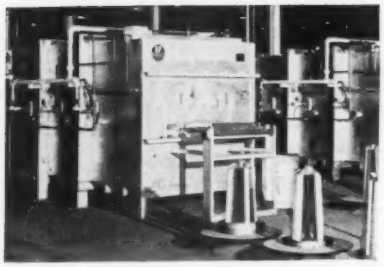
MOST VERSATILE HEAVY DUTY UNIT EVER DESIGNED. 20:1 RANGE, INSTANT SHIFT FROM AUTOMATIC TO HAND CONTROL AND VICE VERSA. ADAPTED FOR REMOTE CONTROL. SPECIAL EXTRA HEAVY DUTY MODEL "WW" AVAILABLE.

ALL MODELS AND TYPES PROVIDED WITH RAPIDLY ADJUSTABLE END POINT SETTING STOPS. INTERCHANGEABLE ROLLER OR SHEAVE GUIDE PROVIDED TO SUIT REQUIREMENTS.

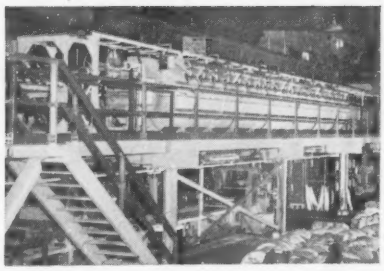
* * * *

Bulletins Covering Each Model Available

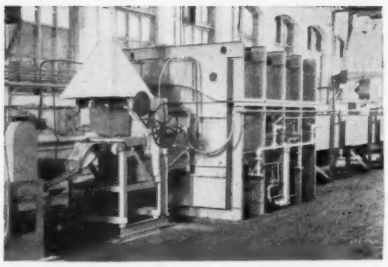
9-57



An EF multiple tube type furnace bright annealing stainless steel wire, continuously. One of an installation of five stainless steel furnaces we built in a prominent steel plant.



Large capacity EF gas fired furnace bright annealing stainless strip. We build them electrically heated or gas fired for wide or narrow strip, for single or multiple strands.



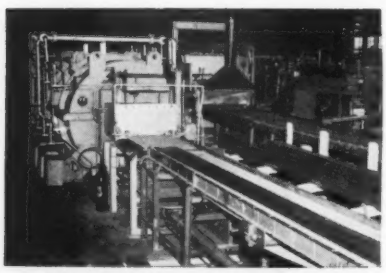
Stainless steel strip in various widths is bright annealed continuously in this EF gas fired special atmosphere installation equipped with an EF gas fired ammonia dissociator.

Bright Annealing Stainless

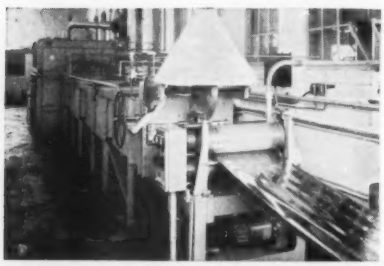
Tubing, Strip, Wire, Stampings and Other Stainless Steel Products

Stainless steel strip, wire, heavy and fine tubing, stampings, flatware, cooking ware, drawn and other stainless steel products, in many shapes and forms, are being bright annealed, uniformly, economically, continuously and with laboratory precision in EF furnaces of various sizes and types we have built.

Extensive experience with stainless steel problems, backed by over 40 years of practical furnace building experience and thousands of successful fuel fired and electric installations, enable EF engineers to design and build the best size and type of equipment needed for handling any product or production, or for any heat processing requirement.



Stainless Steel Tubing in various diameters and lengths up to 24 feet is bright annealed continuously in this EF gas fired furnace.



Stainless Steel Strip. Wide, narrow and in various types, is uniformly bright annealed, continuously, in EF furnaces — any tonnage.

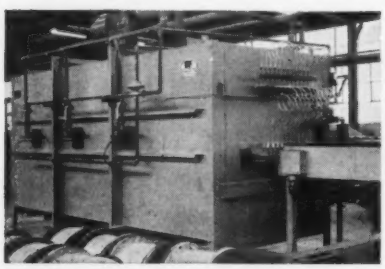
Submit your production furnace problems to experienced EF engineers — it pays.

THE ELECTRIC FURNACE CO.

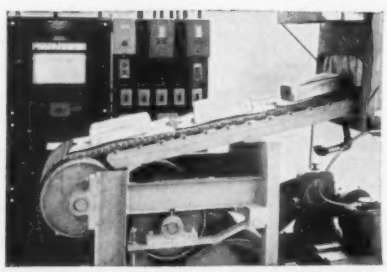
GAS FIRED OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem - Ohio

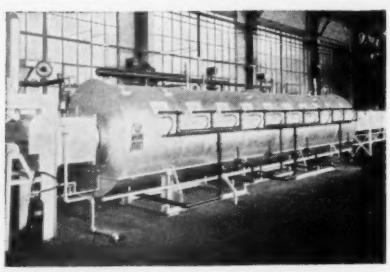
Canadian Associates • Canefco Limited • Toronto 1, Canada



Stainless Steel Wire is bright annealed in this and other EF continuous and batch type gas fired and electric furnaces we build.



Stainless Steel Stampings, flatware, drawn and other products; large, small and in various shapes are bright annealed in EF furnaces



Another type we build for bright annealing stainless strip. This EF furnace also handles other grades requiring lower temperatures.